Ari Haukkala

DEPRESSIVE SYMPTOMS AND HOSTILITY IN RELATION TO SOCIOECONOMIC STATUS, SMOKING CESSATION, AND OBESITY

Academic Dissertation

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To Tuula, Eemi, Julius and Inkka

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CONTENTS

LIST OF ORIGINAL PUBLICATIONS

This study is based on the following original publications, referred to in the text by Roman numerals I-V

I Haukkala, A. (2002). Socioeconomic differences in hostility measures – a population based study. *Psychology & Health,* 17 (2), 191-202.

II Haukkala, A., Laaksonen, M., & Uutela, A (2001). Smokers who do not want to quit - Relation to lifestyle and socioeconomic factors. *Scandinavian Journal of Public Health,* 29 (3), 226-232.

III Haukkala, A., Uutela, A., Vartiainen, E., McAllister, A., & Knekt, P. (2000). Depression and smoking cessation - the role of self-efficacy and motivation. *Addictive Behaviors,* 25 (2), 311-316.

IV Haukkala, A., & Uutela, A. (2000). Cynical hostility, depression and obesity: The moderating role of education and gender. *International Journal of Eating Disorders,* 27 (1), 106-109.

V Haukkala, A., Uutela A., & Salomaa, V. (2001). Depressive symptoms, cynical hostility and weight change: 3-year follow-up among middle aged men and women. *International Journal of Behavioral Medicine,* 8 (2), 116-133.

ABSTRACT

The aim of this study was to examine how depressive symptoms and cynical hostility are related to smoking cessation, obesity, and weight changes and whether socioeconomic status (SES) moderates the association between psychosocial and health related factors. In spring 1992, randomly selected subjects (N=3404) aged 25 to 64, from four areas in Finland: North-Karelia, the Kuopio counties, areas around the cities of Turku and Loimaa, and the cities of Helsinki and Vantaa, participated in a cardiovascular risk factor survey. Participants between 45 and 64 years from North-Karelia were asked to participate in a follow-up study three years later (N=285). Smokers from the annual Finnish health behavior surveys between 1989 and 1994 were also used as another data source (N=4483).

This study is related to a wider discussion of health inequalities between SES groups. Hostility and depression have been proposed as mediators between SES and poor health. It was found that cynical hostility was less prevalent among respondents in higher SES groups but that expression of anger was reported more often among higher SES groups. Divergent results with regard to socioeconomic status require more accurate hostility concepts, especially in health inequality studies. SES differences in smoking prevalence is a major cause for SES differences in health. No significant differences in motivation to quit smoking between smokers in different SES groups was found in this study. However, smokers in higher SES groups were more likely to believe that they were able to quit smoking. Negative emotions such as depression and anger play an important role in addiction to smoking. Here, a cognitive aspect of depression, negative self-perception, was also related to smoking cessation. Smokers of both genders with elevated depressive symptoms had lowered self-efficacy in smoking cessation but depressed female smokers were more willing to quit smoking than other female smokers. Cynical distrust was related to lower self-efficacy in cessation. In relation to weight, depressive symptoms had moderate association with obesity and central obesity. Higher cynical distrust scores were related to higher BMI except among well-educated females. However, in the follow-up study, cynical distrust scores were not related to weight gain or loss, but depressive symptoms predicted both weight gain and loss.

Increasing SES differences in smoking and obesity are important issues in public health. Psychosocial factors, such as depression and hostility, are not easy targets for the

diminishment of SES differences in obesity and smoking. However, knowledge about these psychosocial factors contributes to our understanding about how to change health related behaviors. Furthermore, by examining SES differences in psychosocial factors we can increase our understanding of how psychosocial environments can influence health.

TIIVISTELMÄ

Tässä väitöskirjassa tarkasteltiin miten masentuneisuus ja kyyninen vihamielisyys ovat yhteydessä tupakoinnin lopettamiseen, lihavuuteen sekä painon muutoksiin. Lisäksi miten sosioekonominen asema vaikuttaa psykososiaalisten ja terveyteen liittyvien tekijöiden väliseen yhteyteen. Tutkimusaineistoina käytettiin keväällä 1992 neljältä eri alueelta satunnaisotoksella valittuja 25-64 vuotiaita henkilöitä Pohjois-Karjalan, Kuopion läänin, Turun ja Loimaan seudun sekä Helsingin ja Vantaan alueilta (N=3404). Pohjois-Karjalassa yli 45-vuotiaita osallistujia pyydettiin uusintatutkimukseen kolme vuotta myöhemmin (N=285). Tämän lisäksi tutkimusaineistona oli tupakoitsijoita vuosien 1989-1994 aikuisväestön terveyskäyttäytymistutkimuksesta (N=4483).

Väitöskirja liittyy laajempaan keskusteluun sosioekonomisten ryhmien välisistä terveyseroista ja niiden syistä. Vihamielisyyttä ja masentuneisuutta on esitetty välittäviksi psykososiaalisiksi tekijöiksi sosiaalisen aseman ja terveyden väliselle yhteydelle. Kyyninen vihamielisyys oli vähäisempää ylempien sosioekonomisten ryhmien jäsenille, kun taas suuttumuksen ilmaiseminen suuttuessa oli näissä ryhmissä yleisempää. Erilaiset tulokset lisäävät vaatimuksia käyttää tarkempia vihamielisyys käsitteitä erityisesti tutkittaessa sosioekonomisten ryhmien välisiä terveyseroja. Sosioekonomisten ryhmien väliset erot tupakoinnissa ovat osoittautuneet tärkeäksi tekijäksi näiden ryhmien välisille terveyseroille. Tutkittaessa tupakoinnin lopettamiseen liittyvia asenteita havaittiin, ettei halussa lopettaa tupakointi esiintynyt merkittäviä eroja sosioekonomisten ryhmien välillä. Sitä vastoin usko tupakoinnin lopettamisen onnistumiseen oli yleisempää enemmän koulutetuilla tupakoitsijoilla. Tupakoinnin yhtenä riippuvuutta ylläpitävänä tekijänä on pidetty tupakoinnin vaikutusta kielteisten tunteiden kuten masentuneisuuden ja suuttumuksen hallintaan. Tutkimuksessa havaittiin myös masennusoireisiin liittyvien kognitiivisten tekijöiden, kuten kielteisen ajattelun itsestä, heijastuvan tupakoitsijoilla heikompaan uskoon tupakoinnin lopettamisen onnistumisesta. Naistupakoitsijat, joilla oli masennusoireita olivat sitä vastoin halukkaampia lopettamaan tupakoinnin. Kyyninen vihamielisyys oli yhteydessä huonompaan uskoon lopettamisen onnistumisesta. Masennusoireet olivat yhteydessä sekä korkeampaan keskivartalolihavuuteen että painoindeksiin perustuvaan lihavuuteen. Kyyninen vihamielisyys oli yhteydessä korkeampaan painoindeksiin muissa ryhmissä paitsi eniten koulutetuilla naisilla. Seurantatutkimuksessa se ei kuitenkaan ennustanut painonmuutoksia,

sitä vastoin masennusoireet ennustivat sekä painon nousua että laskua kolmen vuoden seurannassa.

Sosiaaliryhmien väliset erot tupakoinnissa ja ylipainossa ovat lisääntymässä ja tämä pitäisi ottaa huomioon terveyden edistämisessä. Psykososiaaliset tekijät, kuten masentuneisuus ja vihamielisyys, ovat vaikeita terveysinterventioiden kohteita näiden erojen vähentämiseksi. Ne tuovat kuitenkin tarkeää lisätietoa terveyskäyttaytymisen muutoksiin tai terveyttä ylläpitävin tekijöihin. Samoin sosioekonomisten erojen tarkastelu psykososiaalisten tekijöiden ja terveyden välisessä tutkimuksessa tuo merkittävää lisätietoa miten sosiaalinen ympäristö vaikuttaa terveyteen.

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My other supervisor professor Erkki Vartiainen taught me how to work with epidemiological data and cardiovascular risk factors. He also tried to promote the idea that work had to finish on time. However, I was not the best student in this topic. I'd like to offer really warm thanks to Erkki for his support during these years. Later, I was lucky to have a third excellent supervisor, professor Eero Lahelma. I would like to thank him for his prompt and valuable comments, especially in the later phases of my dissertation.

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While working with the dissertation, something more important has been growing. Our children Eemi, Julius and Inkka have been a source of pure happiness from Lipasvaara to Boston. I'd like to thank their grandparents as well for their support during these busy years. My warmest thanks go to my dear wife Tuula, who has encouraged our family to make sometimes unusual and demanding choices that have made our life rich and enjoyable.

Helsinki, July 2002

ABBREVIATIONS

ANCOVA	Analysis of Covariance
AVTK	Annual health behaviour survey (Aikuisväestön terveyskäyttäytymiskysely)
AX/Out	Anger Expression
AX/In	Anger Suppression
AX/Con	Anger Control
BDI	Beck Depression Inventory
BMI	Body Mass Index
95% CI	95 Percent Confidence Intervals
CynDis	Cynical Distrust Scale
CVD	Cardiovascular disease
FINRISK	National risk factor survey in Finland
Ho	Hostility
MANCOVA	Multivariate Analysis of Covariance
OR	Odds Ratio
SES	Socioeconomic status
STAXI	State Trait Anger Expression Inventory (Anger, AX/In, AX/Out, AX/Con)
WHR	Waist to Hip ratio

1. INTRODUCTION

Smoking and obesity are two major public health problems in the world. The background of this thesis is in cardiovascular research, despite the fact that smoking and obesity contribute to the risk of many other major diseases. The role of the psychological or psychosocial factors in cardiovascular research is widely examined but how they are related to these two risk factors is examined less extensively. The third concept in this thesis is socioeconomic status (SES), an indicator of people's relative position in society to have or to have access to resources for well being. These three different constructs (psychosocial factors, health behavior and socioeconomic status) create an interesting and complicated framework for this thesis. First, there is the social structure of society and how it affects individuals' psychosocial and physical health in different strata of society. Second, there are psychosocial factors that have an impact on health but also may have effects on socioeconomic position. Finally, not only diseases but also health related behaviors like smoking and, drinking, or personal characteristics such as obesity might have psychosocial consequences or a negative impact on occupational or educational careers. In the following review, I try to capture the relevant sections of the literature to show why it is important to examine these factors together.

The research area that has brought socioeconomic status, psychosocial factors and health together is related to health inequalities between socioeconomic groups. A vast amount of research has documented a consistent and continuous gradient of morbidity and mortality according to educational, income or occupational standing (Marmot & Wilkinson, 1999). Individuals higher in social hierarchy enjoy better health than those in lower groups. These differences between socioeconomic groups seem to be larger among men than women and are increasing in many countries (Mackenbach et al., 1997). In Finland, life-expectancy among male manual workers has increased by 3.8 years between 1970 to 1990, while among non-manual workers the increase was 5.1 years (Martikainen, Valkonen & Martelin, 2001). Labelling these as differences, variations or inequalities may have some political basis but in this thesis differences and inequalities are used interchangeably. Many governments, including Finland, have recently created political acts to reduce health differences (Valtioneuvosto, 2001). After extensive documenting of health inequalities there is a requirement to move from descriptive research to etiologic research to create better policies

and practices to help diminish health inequalities (Kangas et al., 2002; Mackenbach & Bakker, 2002).

Although, socioeconomic differences in health have existed throughout history, they are not independent of historical and cultural context. The empirical data of this thesis was collected in Finland at the beginning of 1990s. During that time, Finland was facing one of the worst economic recessions in decades after a long period of fairly fast and steady economic growth since the end of World War II. As an example of this recession, the unemployment rate rose from 3% in 1990 up to 16% in 1993 (Statistics Finland, 2000). Since data is mostly cross-sectional there is no possibility to examine the effects of this historically specific event. However, it is likely that it did have effects in individual levels of health and well-being for some of the subjects in this study.

2. LITERATURE REVIEW

Differences in health can be seen as one consequence of social stratification. Key components in stratification systems are the institutional processes that define certain goods as valuable, rules that distribute these goods to different social positions and mobility mechanisms that link individuals to these positions (Grusky, 1994). Three basic concepts in stratification are class, status and power, reflecting the inequality between members of the society (Sørensen, 1994). There are class-based theories, for example Marxist or Weberian, which try to explain what are the basic causes for inequality between classes. They also included definitions on those that who belong to each class, which have, to an extent, been updated to current society (Sørensen, 1994). The concept of power can be seen as resources that affect the action of others. The problem with power is its measurability as well as a lack of common definition of the concept itself. A third concept, status, is the most widely used of these three dimensions. Status classifications are as nominal as sosioeconomic status. There is no need to create order or relations between a status groups, members of society can be classified to these groups according to some principles that are not related to certain social theories. This can make measurement or classification easier but since these classifications are not related to any particular theory there are no clear theoretical explanations for inequalities between these groups. There are three basic indicators for socioeconomic status; education, income and occupational status. These indicators have causal order, as people usually acquire education first which predicts occupation that has a certain income. Education is a commonly used indicator as it usually does not change substantially in adulthood and it is relatively reliable to measure. Occupation is also a commonly used indicator but does not classify respondents outside of the labour force. Income often has reliability problems especially with self-reported data, but it is a close indicator to access to resources. Furthermore, Krieger, Williams and Moss (1997) have argued that the impact of neighbourhood SES is a better indicator of environmental factors than individual SES while other studies have found individual SES to be more accurate (Osler et al., 2002).

The landmark for current scientific discussion of health inequalities was the report by a working group on health inequalities, lead by Sir Donald Black. This document, later referred to as the Black report (Townsend & Davidson, 1982), assessed the conceptual frame for discussion about health inequalities for decades. The possible explanations for

inequalities were categorized as the possibility of artefact, health selection, cultural explanation and material circumstances. According to McIntyre (1997), each of these explanations include a “hard” and “soft” version. The possibility of simple artefact of measurement was actively discussed, especially in relation to British studies. This was soon excluded as a minor factor, despite the fact that there are measurement problems both with health and SES indicators (Davey Smith, Blane, & Bartley, 1994). In strict formulation of health selection, poor health causes poor social class position but not the reverse. Heath selection was proven to be only a minor explanation despite the fact that it is possible that health problems lead to poorer socio-economic status (Ross et al., 1992). There has been major discussion between two latter social causation explanations; cultural/behavioural and materialist/structural. According to the hard version of the cultural/behavioral explanations, members of lower social classes adopt poorer health behaviors like smoking and poor diet, and differences in these explain health inequalities. In the soft version, differences in health behaviors effect health inequalities, but there are strong social forces influencing the gradient in these health behaviors. In the hard material /structural explanation, physical and material conditions, determined mainly by occupational class are the main reasons for health inequalities. In the soft version, social position also influences psychosocial factors, along with material conditions (McIntyre, 1997). This framework has dominated the discussion of health inequalities since then.

2.1. Psychosocial factors in health inequality studies

One of the problems with the Black report framework was the location of psychosocial factors. “Psychosocial factor” is a widely used term in health literature that seems to cover a wide range of concepts from psychological traits to social relations. Sometimes even socio-demographic position or health behaviors are included in the concept of psychosocial factors. According to the WHO definition (WHO, 1976), psychosocial factors are related to psychological traits of individuals, structure and the action of social groups and interactions between the groups and the individual. According to this, there are cultural factors that define the roles of individuals and organize how one would express and act in different social situations. According to Bäckman (1992), the first category of psychosocial factors includes individual factors, the second social relations and social environment and the third the social structure of society. Levi (1981) has been more specific in defining psychosocial factors, he states that there are always individuals who experience or

act according to these psychosocial factors, although the social factors listed above also effect these experiences. Hemingway and Marmot (1999) have adopted a similar approach indicating that psychosocial factors relate psychological phenomena to the social environment and possibly to pathophysiological changes in individuals. Despite this wide range of definitions in health related research the term psychosocial factor usually refers to concepts such as social support, anger/hostility, depression or anxiety, as used by Hemingway and Marmot (1999).

According to McIntyre (1997) the role of psychosocial factors in health inequalities studies have arisen from three different backgrounds. Marmot and Theorell (1988) proposed that differences in psychosocial factors related to work, such as the control or demands of one's occupation, could be one explanation for health inequalities. Another tradition comes from cardiovascular research, where psychosocial factors like type A behaviour, hostility, social support or depression were used as risk factors for cardiovascular diseases (Adler et al., 1994). Finally, recent approaches aimed at explaining why relative income inequalities are more predictive of health inequalities than absolute income inequalities have used psychosocial factors as a pathway for this association. Psychosocial factors, like hostility, can be consequences of unequal income distributions that, in turn, are related to health outcomes (Wilkinson, 1999). One of the early explanations for health inequalities outside of the Black report was the Kessler (1979) model, where lower SES persons not only receive more exposure to psychosocial stressors but may also be more vulnerable to these stressors. In recent years, psychosocial factors have been extensively examined as pathways from social position to health (e.g. Adler, Marmot, McEwen, & Stewart, 1999). However, the manner in which social position is related to psychosocial factors has been less extensively examined.

2.2. Hostility

Hostility has remained one of the most commonly used psychosocial factors in health psychology (Siegman, 1994). As with psychosocial factor, there is also a wide range of definition for hostility. Hostility has been treated as an independent personality trait (Zuckerman & Cloninger, 1996) but also as a part of more general personality traits. In relation to Eysencks' (Eysenck & Eysenck, 1995) three global traits (extroversion, neuroticism and, psychoticism) hostility is an important part of psychoticism (Bouchard & Loehlin, 2001). In Cattell's 16 PF personality measure (Cattell, 1943), Factor L (the

suspiciousness dimension) has been used as a hostility measure (Aldwin et al., 2001). Sometimes in trait models hostility might appear with the label of aggression but overall hostility has been an integral part of major personality trait structure models (Bouchard & Loehlin, 2001). In the current state of the art personality trait model, the “big five” (Costa & McCrae, 1997), neuroticism includes a tendency to experience anger. In contrast to an agreeable person, an antagonistic person is described as irritable, distrustful, rude, suspicious or cynical (Costa, McCrae, & Dembroski, 1989). In relation to hostility, Smith (1994) has suggested one uses personality traits as pairs for more accurate prediction of health outcomes. As an example, an antagonistic person who is introverted (sceptical, unfriendly and cynical) would be in higher risk for adverse health outcomes than antagonistic person who is extraverted (combative, domineering or controlling) (Smith, 1994).

However, research on hostility and cardiovascular research has roots in type A behaviour. The type A coronary prone behavior pattern (TABP) was invented by two cardiologists, Friedman and Rosenman, during the 1950s. They found that heart disease patients were more likely to have a competitive orientation, time urgency and impatience, and aggressive and hostile behavior when compared to healthy males (Friedman & Rosenman, 1974). Early prospective studies (Haynes, Feinleib, & Kannel, 1980; Rosenman, Brand, Sholtz, & Friedman 1976) and the first secondary prevention project (Friedman et al., 1986) had promising results on the association between TABP and cardiovascular disease (CVD) until the first negative findings appeared (Shekelle et al., 1985; Johnston, Cook, & Shaper, 1987). The problem with TABP was the multidimensionality of the Type A concept (Jackson & Mavrogiannis-Gray, 1988; Julkunen, 1996; Ravaja, 1996). Some dimensions of Type A behavior, like competitiveness, were positively related to occupational positions (Keltikangas-Järvinen & Räikkonen 1989; Kivimäki, Kalimo, & Julkunen, 1996). In addition, among British civil servants Type A behavior was more prevalent among those with a higher occupational grade (Marmot et al., 1991). Negative findings among Type A behavior led researchers to search for the “toxic“ component of the TABP, which turned research towards hostility and anger (Siegman, 1994). Barefoot et al. (1983) found that Cook-Medley hostility scores among medical students predicted CHD 25 years later. The hostility scale was from a study where Cook and Medley (1951) examined what items from the MMPI personality test discriminated good teachers from bad teachers. Items that discriminated between these teachers revealed types of individuals who dislike and distrust others (Cook & Medley, 1951). Since the MMPI was one of the most widely used

personality measures (Edwards & Abbot, 1973), the Cook-Medley Ho scale became an extensively used hostility scale in health research. Despite later studies that revealed that Cook Medley hostility is more about cynical mistrust than anger or aggression (Costa, Zonderman, McCrae, & Williams, 1986; Greenglass & Julkunen, 1989), hostility has remained the label for this scale in health related studies.

Research between hostility and health has primarily grown from empirical findings. There has been increased discussion about the concept of hostility and its mechanisms in relation to health (Barefoot, 1992; Julkunen, 1996; Kassinove & Sukhodolsky, 1995; Smith, 1992; Spielberger et al., 1985) but this has not diminished the variety of hostility measures. The dispersion of hostility scales were demonstrated by Miller et al (1996), who found 63 different measures of hostility for their meta-analysis. First, hostility measures include both interview ratings by others and self-report measures but these methods seem to correlate only moderately (Dembroski, MacDougall, Williams, Haney & Blumenthal, 1985). Second, some hostility scales, like Cook Medley Ho, include several subscales (Barefoot, et al., 1989; Siegman, Dembrowski & Ringel, 1987). Furthermore, different self-report scales of hostility seem to measure different aspects of hostility (Miller, Kaplan, & Salonen, 1995). One solution for the construct validity problem has been divide hostility into three different components: the *cognitive* component consists of negative beliefs about others who are seen as unreliable, and selfish; the *affective* component includes emotional states, like anger; while aggression, acts or verbal, is an example of the *behavioral* component of hostility (Buss 1961; Barefoot, 1992; Smith, 1994). This framework has been useful when classifying hostility measures and also relates basic concepts (hostility aggression, and anger) to each other. Furthermore it has lead to discussions about whether these components have different effects on health (Barefoot, 1992; Julkunen, 1996; Smith, 1994).

Within emotion research the ambiguous condition of anger concepts has been recognised, perhaps best reviewed in an article by Russell and Fehr (1994), titled “Fuzzy concepts – fuzzy theory”. As an example, they summarized that anger is said by some to be a subcategory of hostility or vice versa while other researchers argue that they are, in fact, identical (Russell & Fehr, 1994). Spicer and Chamberlain (1996) have discussed why the choice of definition is important. A common definition of anger in health psychology is ‘an emotional state that varies from mild irritation to fury and rage” (Spielberger, et al. 1986). Spicer and Chamberlain (1996) argue that this definition leads to individualistic

interpretations that especially omit social causes for anger. The causes of anger are one of the main research subjects in emotion research (Russell & Fehr, 1994) that seem to be absent from health psychology studies. Spicer and Chamberlain (1996) compared Spielberger's definition to another where anger has the function of adjusting social behavior when someone has violated rules of behaviors (e.g., Oatley & Jenkins, 1996). Anderson and Armstead (1995) give an example of the latter definition when they argue that higher hostility scores among Afro-Americans compared to the white majority in the U.S. (Barefoot, Peterson, Dahlström, & Williams, 1991) is an adaptive coping response to a more threatening environment. Thus, hostility may be viewed not as an individual trait but as a consequence of environmental factors, independent of family (Anderson & Armstead, 1995). Conversely, it has been shown that adverse childhood experiences increase hostility scores in later life (Matthews, Woodall, Kenyon, & Jacob, 1996; Räikkönen, Katainen, Keskivaara, & Keltikangas-Järvinen, 2000). Conger et al (1994) have proposed a model where economic hardship forecasts marital conflict as well as hostility and inconsistency in parents' dealings with their children. These conditions, in turn, correlate with antisocial behavior during adolescence (Conger, Ge, Elder, Lorenz & Simons, 1994). Significant parent-offspring correlations have been observed in Ho scores (Kaprio et al., 1995), implicating that familial, and possibly genetic factors affect both poor parenting styles and, later, hostility in the offspring as well. However, these two definitions of anger are not necessarily contradictory. There are causes of anger, that may or may not relate to society, that lead to the angry emotions described by the trait anger definition defined by Spielberger et al. (1985). Nevertheless, the omission of causes of anger may lead to incorrect conclusions, especially when socioeconomic differences in hostility measures are examined.

2.2.1. Hostility and SES

Recently, hostility has been linked to health inequalities in two different ways. Williams (1998) stated that to reduce health inequalities it is important to reduce hostility by improving childhood conditions, especially the parenting style of mothers in lower socioeconomic groups. In this model, hostility is seen as a permanent trait that develops during childhood. Wilkinson (1999) has proposed that increasing inequalities in income seems to be leading towards an increased social hierarchy, which is creating feelings of distrust and anger among the poorer persons. An ecological study between U.S. states

revealed that social capital, measured with cynical hostility questions, mediates the association between income inequalities and mortality (Kawachi, Kennedy, Lochner & Prothrow-Stith, 1997). Still, in both models hostility is expected to inversely relate to SES.

Several epidemiological studies have reported differences in hostility scores along with other risk factors. Cook-Medley hostility scores, reflective of the cognitive component of hostility, have been inversely related to SES (Barefoot, et al., 1991; Marmot et al., 1991; Scherwitz, Perkins, Chesney & Hughes, 1991). Good childhood conditions, higher education, and white-collar work were all related to lower cynical distrust scores among middle-aged Finnish men (Lynch, Kaplan, & Salonen, 1997). More affective measures, like trait anger and anger suppression, were higher among less educated middle-aged women, but in anger expression, there were no significant differences (Matthews, Kelsey, Meilahn, Kuller & Wing, 1989). Among the older males, cynicism related dimensions had strong inverse association to education while more affective dimensions did not have any clear association with education (Kubzanky, Kawachi, & Sparrow, 1999). Among American female veterans, higher hostility scores were related to lower income but not educational level (Calhoun et al., 2001). Trait anger style hostility scores developed for use in a Finnish Twin cohort Study (Koskenvuo et al., 1988) were inversely related to social position among males but not among females (Romanov, et al., 1994). Scores from the same scale were higher among municipal employees with higher incomes (Vahtera, Kivimäki, Koskenvuo & Pentti, 1997). All the studies mentioned above have examined hostility as one risk factor among others, but one recent study has concentrated more specifically on SES and anger. Schieman (2000) reviewed two different approaches; anger as a consequence of stratification where angry emotions are highest among the oppressed and powerless, and education as an indicator of power, used to express anger more freely. From the U.S. General Social Survey it was found that well educated people were less likely to display their anger but perceived the appropriateness of anger more positively than the less educated (Schieman, 2000). Differences in the sense of control, measured by disagreement on fatalism items, diminished these differences between educational groups (Schieman, 2000).

2.2.2. How hostility is related to health

Smith (1994) has categorized different models of how hostility is related to cardiovascular diseases. The first model is labelled the *physiological reactivity* model. Anger,

as well as other negative affects contributes to CHD by increased physiological responses to stressors (Williams, Barefoot, & Shekelle, 1985). Frequent episodes of anger create adverse cardiovascular and neuroendocrine responses. According to the second model, people with hostility have lower levels of social support, more depression and stressful life events (Smith & Frohm, 1985). This model is labelled the *psychosocial vulnerability* model. The *transactional* model extends the reactivity and psychosocial model so that hostile individuals have increased reactivity to self-imposed stressors so that their own negative behavior leads them to heightened cardiovascular reactivity (Smith & Pope, 1990). The transactional model weighs the social consequences of one's own behavior while the psychosocial model treats them as correlates (Smith, 1994). The c*onstitutional vulnerability* model (Krantz & Durel, 1983) speculates that biological factors such as a hyperresponsive sympathetic nervous system may cause both manifestations of anger and vulnerability to CHD. The *health behavior* model, suggests that hostility produces poor physical health through lifestyle factors (Leiker & Heiley, 1988). However, as with explanations of health inequalities, we can not clearly explain why hostile individuals have poorer health behavior, such as alcohol abuse, physical inactivity, caloric intake or smoking.

2.3. Depressive symptoms

The other psychosocial factor in this study, depressive symptoms, has a different background to that of hostility. While hostility has been seen as a negative human trait or emotion, depressive symptoms or depression has been treated more as a disease. The concept of depression may include depressive moods, depressive symptoms or depressive disorder. There is an ongoing discussion about whether depression is a continuum or if there is a qualitative difference between mild depressive symptoms and major depression (e.g., Clark & Beck, 1999; Coyne, 1994). Central psychological symptoms in depression are depressive mood (loss of affect), loss of interest, and, inability to recognize pleasure (anhedonia) and reduced energy leading to increased fatigue. Other symptoms include guilty affect, low self-esteem, self-destructive thoughts and an inability to make decisions. There are also many somatic symptoms. Depressed people may sleep too much or not enough, gain weight or lose it and other psychophysiological symptoms that may also increase or decrease. During recent decades the consensus regarding definition of major depression is documented in the evolving international classifications that have lead to the current ICD-10 (WHO 1992) and the DSM-IV (American Psychiatric Association, 1994) versions. However, these

classifications also recognize other categories of mood disorders such as bipolar affective disorder, manic episode and persistent mood disorders such as dysthymia (WHO, 1992). These disorders can be further graded by degree of severity, episodic vs recurrent nature, and presences of psychotic symptoms. Clark and Beck (1999, p.12) conclude that depression consists of a heterogeneous group of disorders that vary in severity, chronicity and clinical presentation. In research settings, depression has been assessed either with psychiatric interviews to diagnose people into nominal categories or with self-rating scales which assess the number of depressive symptoms. The most common self-rating scales, that include similar items, have been the Beck Depression Inventory (Beck et al., 1961), the Zung self-rating depression scale (Zung, 1965) and Center for epidemiological depression scale (CES-D) (Weissman et al., 1977). The relation between self-rating scales and psychiatric interviews can be described so that those who have been diagnosed during the interview gain high scores in self-rating scales but those who have high self-rating scores are not necessarily diagnosed as depressed when interviewed (Coyne, Schwenk, & Smolinski, 1991; Weissman et al., 1977). In this study, depressive symptoms refer to depressive mood or mild depression that do not necessarily considerably limit the functionality of a person up to more severe symptoms and even major depression. The concept depression refers to more severe situations that are usually diagnosed and limit the functionality of person severely.

The prevalence of major depression, according to an older definition in the Mini-Suomi Study, was around 5% (Lehtinen & Joukamaa, 1994). Respectively, prevalence of depression during last six months in telephone survey was also 5% in early 1990 (Isometsä, Aro, & Aro, 1997). In most recent study the prevalence of major depressive episode during the last year was 10% (Lindeman et al., 2000). Elevated depressive symptoms are estimated to be at about 15% in the Finnish population (Isometsä, et al., 1997) and mild depression, according to BDI scores, at about the same in a twin study (Varjonen et al., 1997). In a comparison study of 5 European countries, Finland belonged to the medium prevalence of depressive disorders (Ayuso-Mateos et al., 2001). Striking increases in the use of depression medication and early retirements because of depression has raised the concern about an increase in the prevalence of depression. Part of this increase can be explained by better diagnosis and the availability of more effective treatment, but there still is a suspicion that there has been something in society that increased depression during recent decades. In community surveys, changes of depression or depressive symptoms have not changed so dramatically. Two Finnish communities have been examined four times since 1971 and the

level of depression in 1993 was lower than in two assessments made during the 1970s (Lehtinen et al., 1995). Neither was there any significant changes in depression prevalence during a 40 years longitudinal examination of a U.S. county (Murphy, Laird, & Monson, 2000).

2.3.1. The etiology of depression and its relationship to SES

There are several cognitive theories on why people become depressed. Martin Seligman's theory of learned helplessness began from animal experiments where uncontrollable shocks caused lower motivation and reduced the ability to learn new things after the shocks (Seligman, 1975). A later modification of learned helplessness theory includes three kinds of depressive causal attributions: how much a person blames himself (internal) about uncontrollable events, generalizes events to other areas (globalization), and views them as persistent over time (stable) (Abrahamson, Seligman, & Teasdale, 1978). Similar patterns can be found in Aaron Beck's (1967) theory of depression. The descriptive part of the cognitive theory includes a cognitive triad; negative views of self, world and future, where the negative view of self is fundamental (Haaga, Dyck, & Ernst, 1991). The degree of this negative thinking is related to the severity of depression. There are also causal aspects of the theory that include activating events, orienting schemas for these events, a cognitive structure to process this information and cognitive products including negative thoughts that lead to depressive symptoms (Clark & Beck, 1999). According to this model, higher prevalence of depressive symptoms among lower SES groups could be explained by more activating events such as the loss of personal resources and higher sensitivity to negative events. These, in turn, lead to a worsened cognitive structure (like referring events to one's own fault) and cognitive errors that may cause depressive symptoms. These cognitive models have been criticized because they omit factors outside the "head" (Krantz, 1985). Beck has himself said that there is a need to examine the environmental causes of depression (Haaga, Dyke, & Ernst, 1993). However, in a recent exhaustive review of Beck's theory (Clarck & Beck, 1999) there were no citations to socioeconomic factors.

A different view of depression comes from functional theories. Since anger may have an adaptive or functional role in human communication, can depressive mood have a similar functional role? Nesse (2000) classified the functions of depressive mood as a sign of communicating a need for help, signalling yielding in a hierarchical conflict, as a way of releasing one from commitments to unreachable goals, or regulating patterns of investment.

However, Nesse (2000) concluded that there is no evidence thus far that a low mood helps people to cope in difficult situations. Especially in relation to the most severe consequence of major depression, a high risk of suicide, the functional role of depression is questionable. Nevertheless, the possible functions of depressive mood may give some insights into why there may be SES differences in depression and depressive mood.

Empirical findings relating to SES and depression are not clear. Lower education, low childhood SES and occupational status has been found to relate to self-reported depressive symptoms and hopelessness among Finnish men (Lynch, Kaplan, & Salonen, 1997). In Whitehall II depressive symptoms were more prevalent among lower status male civil servants but there were no differences among female civil servants (Stansfeld, Head, & Marmot, 1998). Lower education at the baseline predicted an increase in depressive symptoms (Kaplan et al., 1987). Earlier studies have found manic-depressive disorder to be more prevalent in higher social classes (Bagley, 1973). However, it seems that there are no large differences in major depression (Weissman, 1987). In a large sample that completed a national comorbidity survey, affective disorders, including depression, were more prevalent among low income and low educational groups but differences were smaller than with anxiety disorders (Kessler et al., 1994). In a large-scale Finnish survey from 1980, differences in depression between socioeconomic classes were reported but when examined by gender, differences were not significant (Lehtinen & Joukamaa, 1994). In a telephone survey there were no differences in depression scores by two education groups (Isometsä et al., 1997). In the most recent Finnish survey, there were no differences between educational groups while respondents with a lower income had higher prevalence of depression (Lindeman et al., 2000). It seems that SES differences in depression or depressive symptoms are not large and they are sensitive to the assessment methods.

2.3.2. How is depression related to health?

Depression is related to several chronic diseases such as cardiovascular disease (CVD) (Musselman et al., 1998), cancer (Linkins & Constock 1991; Zonderman, Costa, & McCrae, 1989) and diabetes (Carney, 1998). The mechanisms between chronic diseases and depression are complicated. For example, depression predicts severe cardiovascular disease (Aromaa et al., 1994), but many patients also become depressed after myocardial infarction (Frasure-Smith, Lesperance & Talajic, 1993). Further, depression alters recovery from

myocardial infarction and in addition the likelihood of new infarction increases if patients have depressive symptoms (Frasure-Smith et al., 1995). Depressed patients without other major diseases estimate their health more poorly, suffer more pain, thinking that they are more socially limited, and that their condition does not improve as much as other patients (Hayes et al., 1995). Seeking treatment may become difficult if people are depressed. In addition, depression includes many somatic symptoms like loss of appetite, insomnia or weight gain that may have negative health consequences. Since depression is a syndrome, a collection of different psychological and physiological symptoms, it is not necessarily enough to state that depression predicts some health outcomes. When predicting the health consequences of depression, one should also examine if it is the result of physiological symptoms, lower self-esteem, depressed mood or some biochemical factor like serotonin. When depressive symptoms predicts most of the cancers (Sevick, Rolih, & Pahor, 2000) and cardiovascular diseases (Musselman et al., 1998; Glassmann & Shapiro, 1998) from onset of these diseases to recovery from them, it raises the question of whether there are specific pathways or some more general explanation for all health outcomes. Seligman (1998) has argued that recent studies have concentrated too heavily on biochemical models and seldom examine psychological or social aspects of depression that may have as important part in the aetiology of other diseases.

2.4. Comparing depression and hostility

As discussed above, depression and hostility have different backgrounds that are represented in their assessment as well. A set of depressive symptoms have been derived by consensus for ICD-10 and DSM-IV classifications. Several self-report scales include these symptoms. In contrast to depression, there is little consensus on what the accurate measures of hostility should be (Smith, 1992; Barefoot, 1992; Miller et al., 1994). Self-reported depressive symptoms and depression ratings by trained evaluators have higher concordance rates (Weissmann et al., 1977) compared to hostility, where self-reported hostility and hostility ratings by trained evaluators have only moderate correlation (Dembrowski et al., 1985). Still, there are reports of low correlations between different rates, for example for childhood depression (Achenbach, McGonaughy, & Howell, 1987). Nevertheless, it can be concluded that a more homogenous concept of depression or depressive symptoms help to create less variation in assessments of depressive symptoms. This, in turn makes comparison of different depression studies easier than comparison of studies of hostility, made with

different forms of assessment. Both hostility and depression are negative concepts. However, all widely used depressive symptom measures include negative symptoms and do not create so much variation among non-depressed respondents. For this reason, in practice, all self-report symptom scales are skewed. There are several hostility scales that are skewed in a similar way but there are also several measures, for example cynical distrust (Greenglass & Julkunen, 1989), and anger expression (Spielberger et al., 1988), that are usually close to normal distribution. These scales not only assess highly hostile persons, but also create variation at the "non-hostile" end of distribution i.e. an extremely trustful person or person to whom expression of anger is extremely uncommon.

Most severe cases of depression are included in disease classification and there are several alternative medications for depression. However, a recent study estimate found that only in Finland 15% of those who have depression receive treatment or medication (Laukkala et al., 2001). Hostility is a central trait in antisocial or dissocial personality disorder but is less often treated as a disease and does not have medication to a similar extent as depression has. There are several non-medical treatments for depression that have a well-established scientific background (Clark & Beck, 1999). Different anger management books are numerous, but there are only a few clinical trials for these treatments. A recent review showed that in secondary prevention for CHD, cancer and AIDS programs specifically targeted at to depressive symptoms have been useful but also anger management programs have had favourable outcomes (Schneiderman, Antoni, Saab, & Ironson, 2001). There is no information on whether anger management programs work in primary prevention and especially what dimension of hostility these are targeted towards.

Both depressive symptoms and hostility are psychosocial factors as they are assessed at the individual level but they are affected by social factors surrounding the individual. At the psychological level, both are viewed as negative traits and in relation to possible health outcomes they seem to have negative consequences. One difference between depression and hostility is that in depression negative thinking of one's *self* is crucial whereas negative thinking of *others* is the central trait in cynical hostility. This may reflect some basic difference in attributional style between these concepts. However, depressed persons may often have feelings of anger, and a low mood is not unusual among hostile persons. In the cardiovascular research, most studies concentrated on the independent effect of psychosocial factors, so that the effects of other risk factors, like smoking, are controlled. The topic of this study is to examine how these psychosocial factors are related to smoking and obesity.

2.5. Smoking

Smoking is major cause for morbidity and mortality throughout the world (WHO, 1999). A recent comparison of 12 European countries revealed that there are large differences in the prevalence of smoking between socioeconomic groups especially in northern European countries, including Finland (Cavelaars et al., 2000). Differences in smoking prevalence may be a major cause for socioeconomic differences in ischaemic heart diseases in these countries (Caverlaars et al., 2000). In Finland, the prevalence of smoking was low among older women born before 1940'and higher among more educated women, but after these age cohorts, initiation of smoking has increased dramatically among less educated females (Laaksonen et al., 1999). A similar pattern has been found among Danish female smokers as well (Osler et al., 2001). In Portugal, more educated women, and also more educated men, smoked more than the less educated Portuguese, as late as 1990 (Cavelaars et al., 2000). Especially among women, this transition in smoking prevalence happened at a different time in northern Europe than southern Europe (Graham, 1996). The concept of a smoking epidemic has been offered as an explanation for differences between socio-economic groups (Peto, 1994). According to this, smoking is at first a rare behavior, but becomes more prevalent among higher socio-economic groups and then spreads to lower socio-economic groups (Rogers & Shoemaker, 1971). It is not explained why this process happens at different times among men and women within the same countries. Different legislation and smoking policies explain a major part of the differences between countries despite the fact that the adverse health consequences of smoking have been known at least from 1970. However, differences between genders and SES groups within countries illustrate cultural and social factors may have how strong effect on the prevalence of smoking.

From an individual perspective, the process of smoking includes at least three phases from first experimentation to initiation of smoking to maintenance, and then, possibly, smoking cessation. Since initiation of smoking happens in adolescence, and smoking cessation mostly during adulthood, it is likely that there are different psychosocial factors that effect these two separate processes. Smoking in adolescence was the strongest predictor of difficulties in an educational career in a large Finnish study (Koivusilta, Rimpelä, & Rimpelä, 1998). Similarly, SES differences among adolescents have been found in other countries (Escobedo et al., 1990; deVries, 1991). In recent decades, the differences in initiation of smoking seem to be clear and consistent in many countries. In contrast, SES

differences in smoking cessation are not so well documented. In earlier studies of ex-smokers there has not been large differences in prevalence between educational groups (van Reek & Adriaanse, 1988; Pierce et al., 1989). The prevalence of ex-smokers has increased in Finland during the last few decades and quitting seems to be slightly more common among higher SES groups (Laaksonen et al., 1999). In larger smoking cessation trials where there has been a possibility to compare socioeconomic groups there have been no clear differences in smoking cessation (Gourlay, Forbes, Marriner, Pethica, & McNeil, 1994). In a European nicotine replacement study of over 3,500 smokers only about 14% were able to remain abstinent and neither employment status nor education predicted abstinence (Monso, Campbell, Tonnesen, Gustavson, & Morera, 2001). Since smokers who participate in smoking cessation trials differ in many ways from other smokers, the results based on trials may be biased. However, there have been only a few larger population-based follow-up studies to examine SES differences in cessation. In the Finnish twin cohort study education predicted smoking cessation among female smokers and younger male smokers (Kaprio & Koskenvuo, 1988). In one US study, only 3% of those in the lowest education group were able to remain non-smokers in the last 3 months compared to 5% among smokers in the highest education group (National Cancer Institute, 2000). Among Danish smokers higher social status predicted smoking cessation measured ten years later (Osler et al., 1998). Of the female smokers who participated in Finnish adult health behavior surveys in 1989 and 1990, 13% had quit in 1997 among those who had less than 9 years of education compared to 36% among those female smokers who had more than 13 years of formal education (Luoto, Helakorpi, & Uutela, 1999). In the same study, among male smokers there were no similar SES differences in cessation (Luoto et al., 1999).

Stonks, van de Mheen, Looman, & Mackenbach (1997) explained socioeconomic differences in smoking behavior by differences in cultural, material and psychosocial factors. However, the actual measures were difficult to categorize into these three categories. For example, cultural factors were measured by a locus of control scale that was the best predictor for the differences in former smokers between educational groups (Stronks et al., 1997). However, it is hard to argue how locus of control is different from other psychosocial factors, like negative life-events, coping mechanism, neuroticism or social support dimensions. This framework highlights the difficulties in separating individual factors and environmental/cultural factors when all factors have to be assessed at an individual level. Karvonen and Rimpelä (1998) have used cultural explanations for regional

differences in smoking prevalence. According to this kind of definition, cultural factors are more likely to explain why the prevalence of smoking has increased among lower SES females during the last decades. A qualitative study by Chamberlain and O'Neill (1998) suggests that lower SES subjects experience greater situational pressures to smoke and perceive lower effectiveness of health promoting behavior.

2.5.1. Smoking cessation attitudes

The procession from smoking to quitting includes several psychological factors that affect smoking cessation before physiological or psychological withdrawal problems arise. More than half of all smokers surveyed want to quit smoking and this has remained stable from 1970 in Finland (Helakorpi et al., 2000). In a recent European survey[a], 84% of Swedish smokers stated that they wished to stop compared with less than 40% in Austria, Germany and Italy (Fagerström, Boyle, Kunze, & Zatonski, 2001). In a study among a U.S. working population intention to quit smoking was a powerful and consistent predictor for participation in a smoking cessation program, attempting to quit, and success in quitting (Hennrikus, Jeffery, & Lando, 1995). DiClemente and Prochaska (1982) have conceptualised this process of smoking cessation to consist of five phases starting from precontemplation, contemplation, preparation, action and maintenance of behavior. It is not clear if these are qualitatively different stages or continuum as suggested by Sutton (1996). Intention to quit depends on motivation to quit which in turn is a product of perceived negative and positive consequences of quitting (Sutton et al., 1987). Farkas et al., (1996) found in a population sample that contemplators and precontemplators were as likely to quit and addiction related measures were the best predictors of quitting. British samples have also shown that prior attempts are better predictors of actual cessation than motivation or confidence (Sutton, 1996). However, the decision to change behavior has to be made before quitting. There are several models for behavior change but most of them have common characteristics with the theory of planned behavior (Ajzen, 1985). According to this theory before the act of smoking cessation there is an intention to quit smoking. Factors affecting intention are negative or positive attitudes toward smoking, perceived social pressure for smoking cessation, labelled as subjective social norms, and perceived behavioral control reflecting past experiences and

[a] This European survey had only yes/no alternatives while the Finnish survey had yes/ not sure/ no alternatives.

anticipated impediments and obstacles (Ajzen, 1988). Perceived behavioural control was added later to the model and reflects Albert Banduras' (1986) self-efficacy concept. Self-efficacy refers to confidence in one's ability to make the actions required to attain designated types of performances (Bandura 1986, p. 391). Higher self-efficacy in one's ability to avoid smoking before cessation predicts maintenance of smoking cessation (Baer & Lichtenstein, 1988). It seem to be difficult to find a study were self-efficacy has not predicted cessation (Shiffman et al., 2000). In their own study, average levels of self-efficacy differentiated those who remain non-smokers and those who smoke again but daily changes in self-efficacy did not predict smoking relapses (Shiffman et al., 2000). They conclude that self-efficacy is a stable individual factor that has causal role in abstinence independently of the amount of smoking before quitting (Shiffman et al., 2000)

Motivation to quit smoking and self-efficacy in cessation can be factors that may explain possible socio-economic differences in smoking cessation. However, there seem to be no socio-economic differences in motivation or intention to quit smoking. In a British sample, consonant and dissonant smokers did not differ in education (Eiser, Sutton, & Worber, 1978). Consonant smokers are those who do not want to quit smoking despite the well-known health risks related to smoking and dissonant smokers are those who face the conflict between continuous smoking and willingness to quit (McKennel & Thomas, 1967). Goldstein (1997) found that in the middle-income group there were more consonant smokers than in two other groups in but no differences were found between social classes. In one study using a Canadian sample, education was not related to intention to quit smoking (Ngyuet, Beland, & Otis, 1998). In an Australian sample, stages of change among smokers was not related to educational level (Owen, Wakefield, Roberts & Esterman, 1992). In a self-selected large Dutch smoking cessation trial, there were more of those who did not have any intention to quit smoking among the more educated respondents (Dijkstra, Roijackers, & de Vries, 1998).

Current figures in smoking cessation are not encouraging. Even with high doses of nicotine replacement, less that 20% of smokers are able remain abstinent after one year (Fiore et al., 1999). What makes cessation so difficult is the addiction that is divided between physiological and psychological dependence. Nicotine is the most important addictive factor in cigarettes. Nicotine has the maximum peak in the brain within 5 minutes after smoking, while nicotine gum takes 30 minutes and a nicotine patch 4 to 9 hours (Benowitz, 1988). This may be one explanation why smokers fail in their cessation attempt even with high doses of

nicotine. There are also individual differences in how addicted smokers became. Some smokers, labelled chippers, seem not to become addicted despite the fact that they receive the same amount of nicotine as heavy smokers (Shiffman et al., 1990). Another explanation for unsuccessful cessation attempts is psychological dependence. Early studies relating to smoking tried to examine if a certain personality type was more common among smokers than non-smokers. The only personality trait that had some consistency in different studies was neuroticism while results related to extroversion have been more mixed (McCrae, Costa & Bosse, 1978). Ashton and Stepney (1982) proposed a model suggesting that there are more complex interactions between genetic background, personality and smoking. For diseases like lung cancer the effect of smoking is more direct and then perhaps the effects of personality is less obvious compared to cardiovascular diseases, where association can be more complex.

Another early approach in smoking and psychology was related to the question as to why people smoke. These approaches led to different smoking motive typologies including dimensions such as addictive, negative affect reduction, habit, pleasure, or stimulation (Ikard, Green, & Horn, 1969). These self-reported scales had good psychometric properties and stability over measurement times (Costa, McCrae, & Bosse, 1980) but they were not consistently related to "real" smoking behavior e.g. amount of smoking in a stressful situation (Shiffman, 1993). It seems that smokers may have several motives for smoking and causal relationships between these motives and smoking remain unclear (Shiffman, 1993). If a person smokes more than 20 cigarettes daily, it happens in all kind of situations and emotional states. Another difficulty is that people can smoke when they are "bored", i.e., nicotine may effect a non-specific neurological system that regulates consciousness and one's basic activity level. On the other hand, some smokers found smoking helpful in a stressful situation to help them concentrate and decrease arousal. Smoking and nicotine can serve both functions, increasing arousal and decreasing arousal, so both reasons – boredom and stress - can be reasons for smoking (Ashton & Stepney, 1982). Psychological dependence may describe more as a consequence of a learning process how in certain situations and emotional states smoking has some positive functions. Coan (1973) differentiates between neutral habit types of situations, pleasurable (such as finishing a meal), distressing or monotonous situations. The positive function of smoking is conditioned to situations and after cessation these situations may provide cues and create urges to smoke. Negative affect reduction is related to negative emotions and it has been long proposed that it has an important role in smoking cessation (Tomkins, 1966). Leventhal and Clearly (1980) argued that regulation of

emotions is a core element of smoking motivation. Recently, Piasecki, Kenford, Smith et al. (1997) have proposed a broadened view of withdrawal that recognizes its probable affective basis. Hughes (2001) presents a model that treats nicotine not only as a physiological problem but also suggests a way that nicotine may have a functional role in psychological regulation. Parrot (1999) has questioned this and argues that smoking causes negative affect or stress among smokers. Stress levels seem to increase when smoking increases, regular smokers are more stressed than non-smoking counterparts and finally, smokers experience a have decrease in stress levels when they have quit smoking (Parrot 1999). In both models, recent studies on depression and smoking have important roles.

2.5.2. Depression and smoking

Hughes et al. (1986) found that prevalence of smoking was much higher among psychiatric patients than other sectors of the population. Similarly, Glassman et al. (1988) found that depressive smokers were over represented in smoking cessation trials compared to the prevalence of depression in the normal population. In the general population, it was found that smokers were more likely to have a history of depressive episodes and have more depressive symptoms compared to non-smokers (Glassman et al., 1990; Anda et al., 1990; Knekt et al., 1996; Hämäläinen et al., 2001). Persons with a history of major depression have been shown to be more likely to be dependent on nicotine (Breslau, Kilbey, & Andreski, 1991). Among young adults, education was found to diminish the association between nicotine dependence and depressive symptoms (Son et al., 1997). Since the association between nicotine dependence and major depression is bi-directional (Breslau, Kilbey, & Andreski, 1993) it has been suggested that the association is caused by a third factor, e.g., common genetic vulnerability to depression and smoking addiction, according to a twin study of US women based on diagnosed cases of depression (Kendler et al., 1993). Recently, bupropion, a medicine that has been used for depression, was found to be a more effective treatment for smoking cessation than nicotine patches (Hurt et al., 1997; Jorenby et al., 1999). This increased the interest in psychopharmacological explanations for the association between depression and smoking. Although the large scale trial mentioned above does not include smokers with current depression, other studies have found that bupropion is effective among those with a history of depression (Hayford et al., 1999). However, depressed smokers have increased risk for new episodes of depression after cessation (Glassman et al., 2001).

Among psychiatric patients (Hughes et al., 1986) and participants in smoking cessation trials (Kinnunen et al., 1996), depression has been found to act as a barrier to smoking cessation. In a community-based sample, only 10% of smokers with depressive symptoms were able to quit smoking whereas 17% of other smokers quit during the 9-year follow-up (Anda et al., 1990). However, in other studies, male smokers who were depressed were as likely to quit as non-depressed smokers (Salive & Blazer, 1993). Depressed smokers have been shown to have more withdrawal symptoms when quitting (Covey, Glassman, & Stetner, 1990) and to be more likely to relapse after quitting (Shiffman, 1982). Depressed smokers were more likely to use smoking for reduction of negative affect than non-depressed smokers (Lerman et al., 1996). Negative thinking about one's self seems to be common for all types of depression (Haaga, Ernst, & Dyck 1991). It can be expected that this general negativeness may lead to negative expectations in thinking of one's own abilities, i.e., in the quitting of smoking. Hughes (1988) has suggested that depressed smokers have lower self-efficacy in quitting. However, the two studies looking at this hypothesis did not find any significant differences in the degree of depression and smoking related cognitions like confidence in quitting (Lerman et al., 1996; Hall, Munos, & Reus, 1991) while in another study, smokers with elevated depressed symptoms had lower self-efficacy (Kinnunen et al., 1996).

2.5.3. Hostility and smoking

There have been several studies on hostility and cardiovascular risk factors including smoking prevalence (Siegler, 1994; Koskenvuo & Kaprio, 1988). However, studies concentrating on smoking cessation and hostility are rare especially compared to depression. Lipkus, Barefoot, Williams and Siegler (1994) found that Cook Medley hostility scores measured while at college predicted both initiation of smoking and the inability to quit smoking measured 20 years later. Buss Durkee hostility scores did not predict current smoking 11 years later when baseline smoking was controlled for (Miller, Markides, Chiriboga, & Ray, 1995). In a cross-sectional study, hostile acts were associated with smoking among men while among women hostile thoughts were related to current smoking (Whiteman, Fowkes, Deary & Lee, 1997). In Finland also, a study of adolescents and their parents found a correlation of 0.25 between smoking status and cynical hostility scores (Kaprio et al, 1995). In an unaided cessation program, one of the most prevalent withdrawal symptoms in the first week following cessation was irritability or anger (Gritz, Carr, &

Marcus, 1991). The nicotine patch reduced the reports of anger among smokers with high hostility scores compared to hostile smokers in a placebo group, but among low hostility smokers there was no difference (Jamner, Shapiro, & Jarvik, 1999).

Since hostility includes several dimensions, there are several hypotheses as to why hostility could be related to the inability to quit smoking. The affective part of hostility includes angry feelings, including nervousness and other negative feelings. Smoking and nicotine produces reduction in aggression (Hutchinson & Emley, 1973). According to the behavioral component of hostility, hostile people are more likely to engage in conflict situations with others. Smoking relapse typically occurs in a situation or context characterized by negative affect (Brandon, Tiffany, Obremski, & Baker, 1990). According to the cognitive aspect of hostility, hostile people have more cynical attitudes and distrust of others. It can be argued that these cynical attitudes may be related to motivation to quit smoking, such that cynical or hostile people do not see the value of health and smoking cessation in the same way as other smokers (Leiker & Heiley, 1988).

2.6. Obesity

Increasing obesity prevalence throughout the world is a relatively new public health problem compared to smoking. Obesity is an excess of body fat that is associated with increased fat cell size. The ultimate reason for obesity is excess caloric intake in relation to expenditure, as a consequence of dietary changes, decreased physical activity or both. Measurements of obesity are usually indirect, since direct measurements of excess body fat are costly and difficult to assess. In epidemiological studies of large numbers of persons, the most widely used and recommended measurement (USSDH 1998; WHO 2000) is the body mass index (BMI) calculated as weight (kg) divided by the square of height (m). This provides a measure of relative weight that is independent of height. Another commonly used indicator in obesity research is the waist to hip ratio (WHR) that is a measurement of body fat distribution. Waist to hip ratio has been found to be a better predictor of mortality than BMI (Larsson et al., 1984; Visscher et al., 2001). Research findings suggest that increase in WHR is more dangerous for cardiovascular, or other chronic diseases like diabetes, than body mass index (Visscher & Seidell, 2001).

A clear inverse relationship has been established between socioeconomic status (SES) and obesity among women, but this difference has been less consistent among men (Sobal & Stunkard, 1989; Lissner, 1997). In Finland, socioeconomic differences in obesity

have existed and are widening among both genders, the differences being most clear among women (Korkeila et al., 1998; Lahti-Koski, Vartiainen, Männistö, & Pietinen, 2000). Low SES may promote obesity through many behavioral mechanisms, but changes in energy intake, physical activity or alcohol consumption did not seem to explain the growing obesity prevalence in Finland (Fogelholm et al., 1998). Similar socioeconomic differences exist in WHR (Lahti-Koski, Pietinen, Männistö, & Vartiainen, 2001; Myllykangas et al., 1995). Self reported weight gain was more prevalent among lower grade employees and among women, in particular, differences between employment grades were large (Martikainen & Marmot, 1999). Similar differences were found between occupational groups among Finnish middle-aged men (Fogelholm et al., 2000).

2.6.1. Depressive symptoms and obesity

The role of psychosocial factors in obesity is complicated. Earlier studies examined if a certain personality type is related to obesity. There were numerous traits found to be related to obesity but these traits were different between studies and sometimes the same traits had opposite associations in different studies of obesity (Stunkard & Wadden, 1992). From these contradicting results the only conclusion was that there were no differences between obese people and other people in terms of personality (O'Neil & Jarrell 1992; Stunkard & Wadden, 1992). A lack of differences between obese and non-obese persons with other psychological factors has also led to the conclusion that there are no differences in psychological functioning between obese and non-obese people (Friedman & Brownell, 1995). In relation to depression and depressive symptoms, some early studies suggest that obesity protects one from depression (Crisp & McGuiness, 1976) especially among men (Palinkas, Wingard, Barrett-Connor, 1996), which was labelled as the "jolly fat" hypothesis. However, later studies have not found this association (Roberts, et al., 2001). On the other hand some studies suggested that discrimination of the obese can cause depression but results were not consistent with this hypothesis either (Ross, 1994). Friedman and Brownell (1995) call these studies first generation studies in obesity research. Examples of second generation studies examine how negative moods, such as anger, depression, or anxiety, can start binge-eating episodes, especially among obese people, that may lead to weight gain (Ganley, 1989; Greeno & Wing, 1994). Findings relating to central obesity raised interest in stress related factors. Björntorp (1991) has proposed that socioeconomic

differences in waist/hip ratio may result from chronic stress-induced arousal, mediated by depression. In addition, other, more detailed models relating to insulin metabolic syndrome have been proposed (Schneiderman & Skyler, 1996). Psychosocial factors are related to the diet-stress relationship, and specifically in stressful situations there have been increases in fat intake (McCann, Warnick, & Knopp, 1990). Another model posits that during stress related moods, including depressive moods, people eat carbohydrates, that in turn, increase the serotonin levels (Wurtman & Suffes, 1997). The Björntorp (1991) model especially addresses depression as a psychological mediator between stress and central obesity. Earlier studies have not found a relationship between depression and WHR (Georges, Muller, & Wear, 1993; Rotchild, Peterson, & Pfeifer, 1989), or these associations have been weak (Wing, Matthews, Kuller, Meilahn, & Platinga, 1991; Rosmond, Lapidus, Mårin, & Björntorp, 1996; Lloyd, Wing, & Orchard, 1996). Ross (1994) argues that according to cross-sectional results, being overweight does not have any direct effect on depression, but relapses in dieting and worse physical health are related to depression.

Worse health is not the only adverse consequence of obesity. In industrialized cultures, negative attitudes toward obese individuals are widespread (DeJong & Kleck, 1986). Compared to those with normal weight, obese individuals are more likely to be described as "lazy, stupid or ugly" in childhood (Staffieri, 1967). Obese adults may be stigmatised because they are held responsible for not being able to control their weight (DeJong, 1980; Croker, Cronwell, & Major, 1993). These kinds of negative attitudes can lead to discrimination against obese individuals in their education and occupational careers (Gortmaker et al., 1993). In addition to the discrimination and negative attitudes that obese people face, current reviews show that they are exposed to increased risk for depression or anxiety (Stunkard & Wadden, 1992; Friedman & Brownell, 1995).

In the follow-up studies related to weight change and psychosocial factors some of these problems with causality can be avoided. However, the diagnostic criteria of depression include both weight gain and weight loss (American Psychiatric Association, 1994). The direction and the extent of weight change seem to be consistent for individuals across the depressive episodes (Stunkard et al., 1991), but it is poorly understood why some depressed people lose weight while others gain weight. Studies among depressed patients have found that those who have a higher BMI are more likely to gain weight in depressive episodes (Stunkard et al., 1991; Carter, Bulik, & Joyce, 1994). Results on depressive symptoms and weight change in population based studies have not been consistent either.

Some studies have found that depressive symptoms predict weight gain (Noppa & Hällström, 1981) but many factors like age, socioeconomic status, gender and obesity level modifies the association between depression and weight change (DiPietro et al., 1992, Barefoot et al., 1998). Among the young people in the NHANES study, less educated men who were depressed gained more weight than men who were better educated and depressed, but among women education modified the association in the opposite direction (DiPietro et al., 1992).

2.6.2. Hostility and obesity

Studies on obesity and cynical hostility have been related to cardiovascular risk factor surveys (Siegler, 1994). In these studies, hostility was expected to increase mortality through adverse health behaviors (Siegler et al., 1992). Usually these studies have found positive associations, where individuals with higher relative weight had higher hostility scores (Houston, & Vavak, 1991; Everson, et al., 1997), but non-significant associations have also been presented (Koskenvuo, et al., 1988; Räikkönen & Keltikangas-Järvinen, 1991). Scherwitz, et al. (1992) found an association between WHR and cynical hostility, but not with BMI. The positive associations have been explained by other health related behavior such as increased energy intake (Scherwitz, et al., 1992) decreased fitness (Leiker & Hailey, 1988; Hasmén, Koivula, & Uutela, 1999).

The few prospective studies available on hostility have reported higher BMI after follow-up among hostile men (Siegler et al., 1992; Ravaja, Keltikangas-Järvinen, & Keskivaara, 1996), but not among women (Adams, 1994), or girls (Ravaja et al., 1996). However, in a study among middle-aged women, baseline trait anger and increase in trait anger over 13 years predicted weight gain, but the hostility did not (Räikkönen, Matthews, & Kuller, 1999). In a Swedish study, cynicism and anxiety predicted WHR in middle-aged subjects among both genders (Nelson et al., 1999). Compared to depression, less specific hypotheses have been presented on how hostility, or what component of hostility, is related to weight changes. Ravaja (1996) concluded that anger-hostility in particular is related to metabolic syndrome symptoms that are especially related to central obesity while Type A leadership has opposite effect. The models discussed here are related either to health behavior differences (eg Scherwitz, et al., 1992) or more specific psychophysiological explanations (eg Ravaja, 1996). However, hostility, or some of its components, has not been presented as a consequence of discrimination against obese people.

2.7. Associations between psychosocial factors, SES and obesity or smoking

The complexity between psychosocial factors, obesity and SES can be seen from figure 1. According to *path A*, there are studies that show how SES differences in diet or exercise behavior may create higher obesity prevalence among lower SES members (Jeffery & French, 1996; Roos et al., 1998; Wardle & Griffith, 2001). *Path B* refers to studies that have shown how obesity is a barrier to educational and occupational careers, leading obese people to lower socio-economic positions (Gortmaker et al., 1993; Sarlio-Lähteekorva & Lahelma, 1999). Similar causal problems emerge with depression and obesity. According to *path C*, depression and depressive mood can lead to changes in exercise and appetite that may lead to an increase or decrease in weight (Stunkard et al., 1991). Studies along *Path D* suggest that obesity or discrimination of obese people can create depression (Brownell & Friedman, 1995). An alternative position, termed the "jolly fat" hypothesis, posits that obesity prevents depression (Crisp & McGuiness, 1976). Some models include several paths, like Björntorp's (1991) hypothesis that those who are in lower socio-economic status face more depression as a consequence of stress (*path E*) and depressive symptoms lead to higher central obesity (*path C*) among low SES. The discrimination hypothesis may also include indirect mechanisms so that discrimination leads to depression and other mental health problems (*path D*), that in turn, have adverse effects on educational and occupational careers (*Path F*). It is clear that cross-sectional results between these three factors cannot be used as causal explanations.

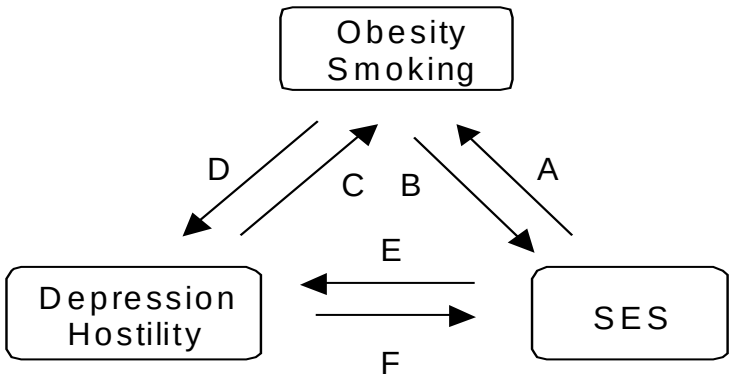

FIGURE 1. Pathways between health indicators (obesity, smoking), psychosocial factors (depression, hostility) and socio-economic status (SES).

Similar pathways could be found in relation to smoking. There are several studies on *Path A* that show how lower socioeconomic family background is related to higher risk of smoking initiation and smoking habit. Results have been less consistent on the effect of smoking cessation (Ossler et al., 2001; Kaprio & Koskenvuo, 1988). Some studies indicate that smoking predicts a poor educational career, according to *Path B* (Koivusilta et al., 1998). It is also possible that smoking could be seen as an obstacle for an occupational career although there is no evidence of this. Especially difficult are associations between smoking and psychosocial factors. Using depression as an example, according to *path C* depressive mood can predict smoking initiation (Escobedo, Reddy, & Giovino, 1998) but depressive mood has also been found to be an obstacle in smoking cessation (Kinnunen et al., 1996). Parrot (1999) claims that smoking is an increasing negative affect, as in *path D*. Further successful smoking cessation has been found to be a risk factor for new episodes of depression among smokers with a history of depression (Glassman et al., 2001).

2.8. Summary of the literature review

In this literature review it was shown that there have been suggestions that hostility and depressive symptoms might mediate the SES effects on health. However, compared to depressive symptoms there is large variation among hostility measures. Few studies have examined how different hostility scales are related to socioeconomic status in representative population samples. Associations with SES do not only reveal why different hostility indicators may give different results in the risk of CVD, but it may also clarify the nature and function of the different hostility measures. Similarly, there are relatively few studies that have reported socioeconomic differences in depressive symptoms in population-based studies.

The SES differences in smoking prevalence may contribute to produce a SES gradient in smoking related diseases like CVD. However, only a few studies have explored the causes for SES differences in smoking prevalence. This may be one unnecessary consequence of the debate between cultural/health behavior and structural/material causes of health inequalities. It is not clear whether differences in smoking prevalence are caused by differences in initiation of smoking during adolescence or by differences in cessation during later life. When planning the public health programs to diminish SES inequalities in smoking,

information on differences in cessation related attitudes, motivation and self-efficacy would be important.

The effects of psychosocial factors on CVD are usually examined as independent effects after controlling for other common risk factors like smoking. However, psychosocial factors like hostility and depression can contribute to CVD through increased smoking and obesity as well. The small abstinence rates for replacement therapies in smoking cessation has led researchers to examine the role of negative affect in addiction. Depression and anger, as a part of the negative affect, have been vigorously examined as a withdrawal problem but there is also the cognitive aspect in both concepts. Despite the fact that negative thinking about the self is a central cognitive feature of depression, there is no clear information on how depressive symptoms are related to motivation and self-efficacy in smoking cessation. Correspondingly, there is no information on how the cognitive component of hostility is related to self-efficacy and motivation in smoking cessation.

In the obesity research, there have been two kinds of approach with psychosocial factors. First, to investigate if depressive symptoms or hostility promote obesity. Second, to investigate if discrimination against obese people or other consequences of obesity foster psychosocial problems. Hostility has been examined in relation to weight gain but not as a possible consequence of the discrimination. A more complicated picture emerges with weight change in relation to depression, as depressive symptoms include both weight gain and loss as somatic symptoms. There are only a few studies that have examined weight changes in relation to depressive symptoms and hostility in a population sample.

3. AIMS OF THE STUDY

The main aim of this thesis is to examine how two psychosocial factors, hostility and depressive symptoms, are related to health related behaviors like smoking cessation and obesity. Depressive symptoms and hostility are negative stable psychosocial factors that are expected to mediate the effect of SES on health. Relating to this, SES differences in psychosocial factors and health related behaviors are examined. Furthermore, how socioeconomic status modifies the associations between psychosocial factors and health indicators is also investigated.

Specific aims

1. To examine socioeconomic differences in depressive symptoms and hostility (I).

2. To examine SES differences in motivation and self-efficacy in smoking cessation (II)

3. To examine how cynical hostility and depressive symptoms are related to motivation, self-efficacy and earlier attempts to quit smoking (III).

4. To examine how cynical hostility and depressive symptoms are related to body mass index, waist/hip ratio and weight changes and how SES modifies these associations (IV, V).

4. METHODS

This study is based on three different data sources. First, the cross-sectional cardiovascular risk factor study FINRISK-92 which included a health examination and two questionnaires. The second data source was from the 3-year follow-up study among a subsample of middle-aged participants from FINRISK-92. The third data source consists of daily smokers from the annual health behavior survey (AVTK), from 1989 to 1994. All three studies were conducted in the Finnish National Public Health Institute (KTL), Department of Epidemiology and Health Promotion. The subjects and data collection procedures are presented separately but the actual questions in the surveys were so similar that measurement of these three data sources are presented together.

4.1. Subjects

FINRISK Study 1992 (I, III, IV)

The main data source of this dissertation is the psychosocial questionnaire that was part of the FINRISK study conducted in 1992. The background of this data source arise from the community intervention “North-Karelia Project ”, started in 1972. At that time, cardiovascular mortality in that area was one of the highest in the world (Puska et al., 1995). As part of the intervention project, the cardiovascular risk factor levels were monitored in the intervention province, North-Karelia and the neighbouring province Kuopio. These two eastern provinces were monitored a second time five years later. Later, with more monitoring areas, this study has become a monitoring tool for risk factor levels in Finland (Vartiainen et al., 1994). In 1992 this risk factor survey included a substudy of psychosocial factors. This separate questionnaire was designed by Dr Antti Uutela, and it includes several widely used self-report scales that were validated in earlier Finnish studies. The following results are mostly based on this psychosocial study.

A random sample of people aged 25-64 years was drawn from the Finnish population register from four areas, (1) North Karelia province, (2) Kuopio province in eastern Finland, (3) the city of Turku and the surrounding areas of Loimaa in southwestern Finland, and (4) the cities of Helsinki and Vantaa in the metropolitan area (Figure 2). The sampling was stratified so that the total sample size was 250 men and 250 women per area, per 10-year age group; the psychosocial subsample comprised those participants that have

been born between the days 12-31 of each month (N = 5,105). The other participants in 1992 were also included in a 3-day food diary study (Roos, 1998).

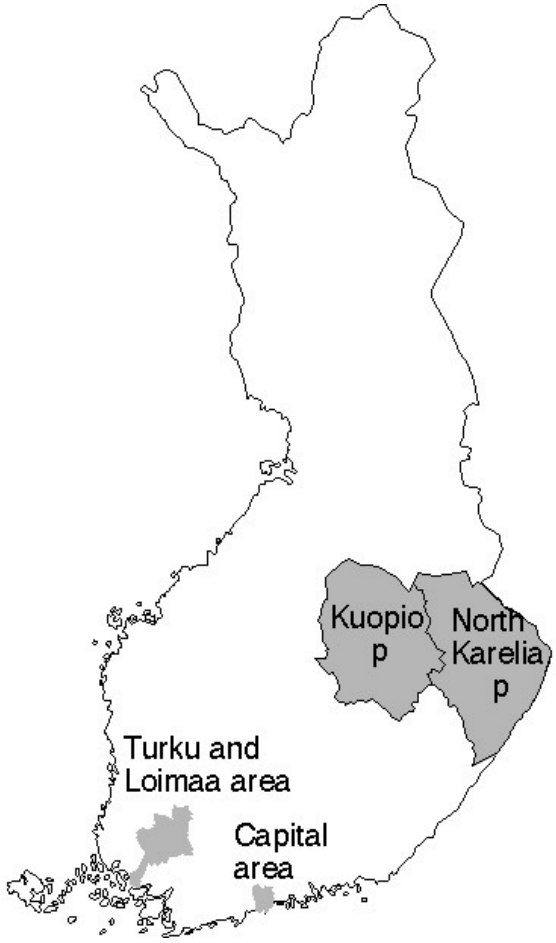

FIGURE 2. Study areas in FINRISK-92 study.

All subjects received an initial questionnaire, which included sociodemographic and health-related questions. They returned it when they came to a health center medical examination where the biomedical measurements were taken. After the medical examination, subjects were assigned to the food diary study and to received the psychosocial questionnaire. The psychosocial questionnaire included several self-reported scales addressing such variables as social support, anger, hostility, and depression. The questionnaires were returned by mail (N = 3,403). The total response rate of the subsample was 62% among males and 72% among females.

The annual health behaviour survey from 1989 to 1994 (II)

The concept behind study II was to investigate those smokers who do not want to quit smoking. Since these smokers consist of only about 10% of current smokers in the FINRISK-92, another data source was used to collect enough unmotivated smokers. This other data source was the annual health behaviour survey (AVTK) among the Finnish adult population (Helakorpi et al., 2000) with a sample of 5,000 subjects. This annually mailed questionnaire, ongoing since 1978, includes the same smoking related questions from the FINRISK questionnaire. While the sample for the FINRISK study is selected from four areas of Finland, the AVTK-study is randomly selected from all areas of Finland. The study population consists of six separate random samples of respondents, 15-64 years of age, studied between 1989 to 1994. Response rates ranged from 64% to 73% among men and from 75% to 82% among females. Those respondents who were under 25 years old in AVTK-study were excluded in order to make an age range of samples similar to the FINRISK study. After this age education, smoking behavior, and other lifestyle related factors are more established. Out of 16,931 respondents 2,709 (33%) were male daily smokers and 1,774 (19%) were female daily smokers. A Daily smoker was defined as a respondent smoking regularly, that is the last cigarette was smoked on the same day or yesterday.

The FINRISK follow-up study 1995 (V)

A sample of 600 participants aged 45 to 64 years from the North-Karelia area of the FINRISK 1992 study, were asked to participate in a follow-up study three years later, in 1995. The procedure, in 1995, was similar to that in 1992. The re-examination was carried out during the same season, from January to March. Results concerning cardiovascular risk factors in the follow-up study have been reported elsewhere (Salomaa et al., 1998). The sample for the psychosocial part of the study consisted of 400 people because 1/3 of the follow-up participants were in the food diary study in 1992. The number of subjects for final analysis consisted of 119 men and 169 women, who had filled in the psychosocial questionnaire at both times. The response rate for people who had participated and responded at all stages was 72% in this subsample.

4.2. Measures

4.2.1. Psychosocial measures

Hostility; State Trait Anger Expression Inventory (STAXI)

Spielberger's (1996) trait anger scale was designed to assess anger proneness as a personality trait. Respondents with high trait anger are expected to perceive more anger provoking situations thus reflecting a higher prevalence of anger (Spielberger, Krasner, & Solomon, 1988). Trait anger (*Anger*) scale includes 10-items like, "I have a fiery temper" or, "I get annoyed when I am singled out for correction," that have high internal consistency (Cronbach α = .83). State anger was left out from the Finnish version (Romanov, Koskenvuo, & Kaprio, 1991). Anger expression dimensions were anger suppression (*AX/In*), control (*AX/Con*), and expression (*AX/Out*). The scale starts with the sentence "When I am angry" including eight items such as, "I keep things in" from the AX/In scale yielding a Cronbach's alpha of .75. The AX/Out scale includes eight items, such as "I strike out at whatever infuriates me," and these items have reasonable internal consistency (α = .76). Anger control dimension includes eight items like "control my temper" and these items had good internal consistency (AX/Con, α = .89). All anger expression style and trait anger items were rated from 1 (almost never) to 4 (almost always) so they could have values from 8 to 36. In the validation study of the Finnish version, correlations between one's own anger ratings and ratings given by spouses varied between .39 to .49 among males and .34 to .46 among female respondents (Romanov et al., 1991).

Cynical Hostility; Cynical Distrust Scale (CynDis)

The cognitive component of hostility was measured with the cynical distrust scale (*CynDis*). Greenglass and Julkunen (1989) derived it from a factor analysis of the Cook-Medley hostility scale (Cook & Medley, 1954). The original Cook and Medley hostility scale included 50 dichotomous items from the MMPI personality test. Since the psychometric properties of the Cook Medley Hostility scale were weak, Greengalss and Julkunen (1989) created a shorter version of the cynical distrust scale. From the original 50 items they derived a three-factor model. The nine items from the first factor include statements such as "No one cares much what happens to you" or "It is safer to trust nobody". Later, one item was dropped (Julkunen et al., 1994) and the scale that is used in this study included eight items.

Each item was rated from 1 (do not agree) to 4 (agree exactly). The scale gives good internal consistency in this sample (Cronbach α = .84). The cynical distrust scale is supposed to measure distrust and human nature as selfish, in general (Greenglass & Julkunen, 1989). The cut-off scores for CynDis tertiles were 8-17,18-21 and 22-32. In the 3- year follow-up, study V, the deviation (follow-up – baseline) for change in C*ynDis scores* was calculalated.

Depressive Symptoms; Beck Depression Inventory (BDI)

The Beck Depression Inventory (BDI) is a frequently used self-report measure of the severity of depressive symptoms (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). The BDI has demonstrated good convergent validity with the psychiatric ratings of depressive symptoms in both clinical and community samples (Beck, Steer, & Garbin, 1988). The Finnish 22-item version included a question on weight gain (Raitasalo, 1977) but this item was excluded to make scores comparable to other studies. Each item includes four or five statements and respondents are asked to choose one of the proposed alternatives. The Cronbach alpha for the 21-item BDI was .87. Beck and Beamestederfer (1974) have proposed cut-off scores for the severely depressed (BDI scores > 29), moderately depressed (BDI scores 29 - 19) and mildly depressed (BDI scores 10 - 18). Respondents with BDI scores below 10 were called non-depressed. In study V, the question concerning weight loss was excluded and the sum of the 20 BDI-items was calculated allowing for two missing items. In the 3- year follow-up, study V, the deviation (follow-up – baseline) for change in *BDI scores* and test retest correlations were calculated.

4.2.2. Indicators of socioeconomic status

Socioeconomic status was measured by three different dimensions; education, income and occupational status. Self-reported years of *education* were used as a continuous variable. The cut-off points for educational groups in study II were less than 8 years, 9 to 12 years, and more than 13 years of formal education. Since study V was done among middle aged and older respondents, the limits for equal size educational groups were less than 7 years, 8 to 10 years, and 11 or more years of education. *Educational level* was divided into those who reported they had only basic education, those who had some vocational education, those who had a college degree and those who had a university degree. *Household income* was self-reported with a scale including 9 predetermined alternatives. These 9 alternatives

were then categorized into 3 larger groups. The first group included persons that reported a household income of less than 160,000 Finnish marks (FIM), the second group were those who reported income between 160,000 FIM to 240,000 FIM, and the third group earned more than 240,000 FIM per year. In study II, the respondent's *income* was based on the tax register information that was linked to study information according to social security number. Respondents were then categorized into income tertiles stratified by gender. *Occupational status* was based on occupational information from the population registers. Occupations were categorized into upper white-collar employees, lower white-collar employees, workers, farmers, and entrepreneurs (Statistics Finland, 1989). Other groups, like retired persons, students, and housewives were excluded when occupational status was used.

4.2.3. Smoking variables

Current or daily smokers were defined as those who said that they had smoked at least 1 year and more than once a day, and continued to do so during the preceding month. Former smokers were those who reported that they had smoked regularly but quit and had remained abstinent for the last 30 days. Dividing current smokers into consonant and dissonant smokers was based on the question: "Would you like to stop smoking (Yes/ No/ Not sure)?" In study II, those smokers who indicated that they do not want to quit are called *consonant smokers,* while those smokers who said that they would like to quit or indicated that they were unsure about quitting were regarded as *dissonant smokers*. In study III, the same question was used but comparisons were made between smokers who want to quit and those who were unsure or did not want to quit. This was done because smoking cessation was the topic of study III. The distributions of the two data sets in this question were identical (Figure 3). The question relating self-efficacy to quitting smoking was the same in both questionnaires: "If you would try to stop smoking, do you think you would be successful (No/ Yes/ Not sure)?" Those who reported that they would be successful in quitting smoking were compared to others. Earlier cessation attempts were assessed with "Have you ever seriously tried to stop smoking, if so when was the last time (Never/ Over a year ago/ 6 to 12 months ago/ 1 to 6 months ago/ in the last 30 days)?" Those who had never seriously tried to quit smoking were compared to those who had made earlier cessation attempts in both study II and III. Additional questions used included; How many years have you smoked regularly? How many cigarettes do you smoke, on average, daily? The 1994 annual health behavior

survey (AVTK) in study II included the Fagerström Test for Nicotine Dependence scale (FTND) (Heatherton, Kozlowski, Frecker, & Fagerström, 1991), which consists of six items.

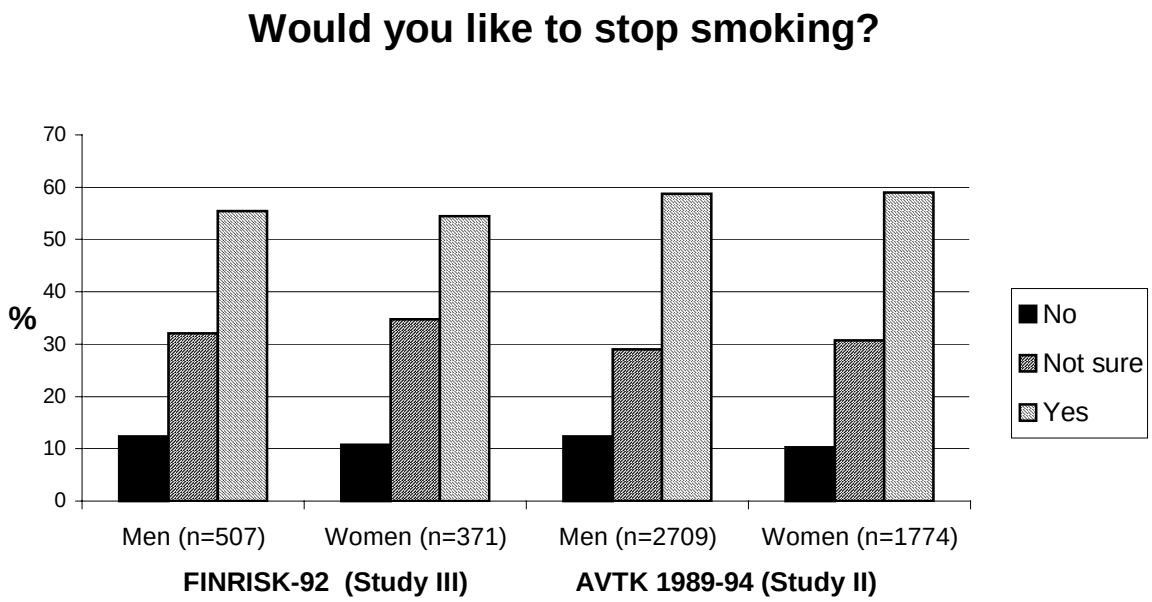

FIGURE 3. The distribution of motivation to quit smoking among daily smokers in the FINRISK study (1992) and the AVTK studies (1989-94).

4.2.4. Obesity measures

The measure of obesity was based on the *body mass index (kg/m^2)*, calculated as weight in kilograms divided by the square of height in meters. Weight was measured in light clothing without shoes to the nearest 100 g, and height was measured to the nearest 0.5 cm. Respondents were divided into four weight groups according to their BMI level; normal group (BMI $\leq$ 25), overweight group (25 < BMI $\leq$ 27), mild obese group (27 < BMI $\leq$ 30), and obese group (BMI > 30) (National Institute Health 1998; WHO 2000). The waist circumference was measured in light clothing at the minimal abdominal girth and the hip circumference at the maximal protrusion of the buttocks. The *waist/ hip ratio* is indicator of body fat distribution. Men that have a WHR over 1.0 and women with a WHR over 0.9 are at an elevated health risk (National Institute of Health, 1998).

In study V, the weight change was measured over 3-years. Given the clear weight difference between men and women, the relative weight change was used instead of absolute weight change. *Weight gainers* were those who had gained more than 2 body mass index (BMI) units from the baseline. The recommended 2 BMI units limit for weight loss was not possible to use (National Institute Health 1998), because there were only 7 men and 5 women who had lost more than 2 BMI units. Therefore, *weight losers* included those who had lost more than 1 BMI unit.

4.3. Statistical methods

Associations between categorical variables were first examined with the χ^2-test. Health related variables are usually related to age and there was a wide age range from 25 to 64 years. Logistic regression was used to examine whether the association remains significant between categorical variables after the possible differences in age and other confounders had been taken into account (Hosmer & Lemenshow, 1989). Second, with logistic regression it is possible to address exactly which categories differed from each other significantly in a dichotomous dependent variable. Interactions were studied using improvements of the model i.e., if the interaction term between two variables increased the prediction after the main effects or these two variables (Hosmer & Lemenshow, 1989). Differences in mean scores between groups were tested with analysis of variances. The effect of age was taken into account with analysis of covariance after checking for possible interactions with the independent variable on the dependent variable (Tabachnick & Fidell, 1994). Comparisons of which groups differ from each other are based on 95% confidence intervals. Since the sample size was large in the FINRISK-92 study even small differences in means may become significant. Therefore, the effect size is reported in ANCOVAS (Wilkinson et al 1999). Pearson correlations and partial correlations were used to examine linear relationships between continuous variables. In addition, according to MANCOVA, a multiple regression model was applied to examine possible interaction effects between continuous variables (Cohen & Cohen, 1983).

5. RESULTS

The main results summarized in this section are from the five original research papers. Into the original papers, there are additional results about SES differences in depressive symptoms, self-efficacy in cessation and earlier cessation attempts. Results from the original study III, those related to cynical hostility and motivation and self-efficacy in smoking cessation have also been added to this dissertation.

5.1.Socioeconomic differences in:

5.1.1. Hostility and depressive symptoms

Of the five hostility measures used in the first study, cynical distrust (CynDis) and anger expression (Ax/Out) were two measures concurrently related to indicators of SES. Cynical distrust scores were lower among respondents with higher SES. However, higher SES respondents were more likely to express their anger when they are angry compared to respondents in a lower position. Figure 4 shows how cynical distrust scores were higher among respondents with a university degree compared to respondents with other forms of education. Similar decreasing scores in cynical distrust were related to income and occupational groups among both genders.

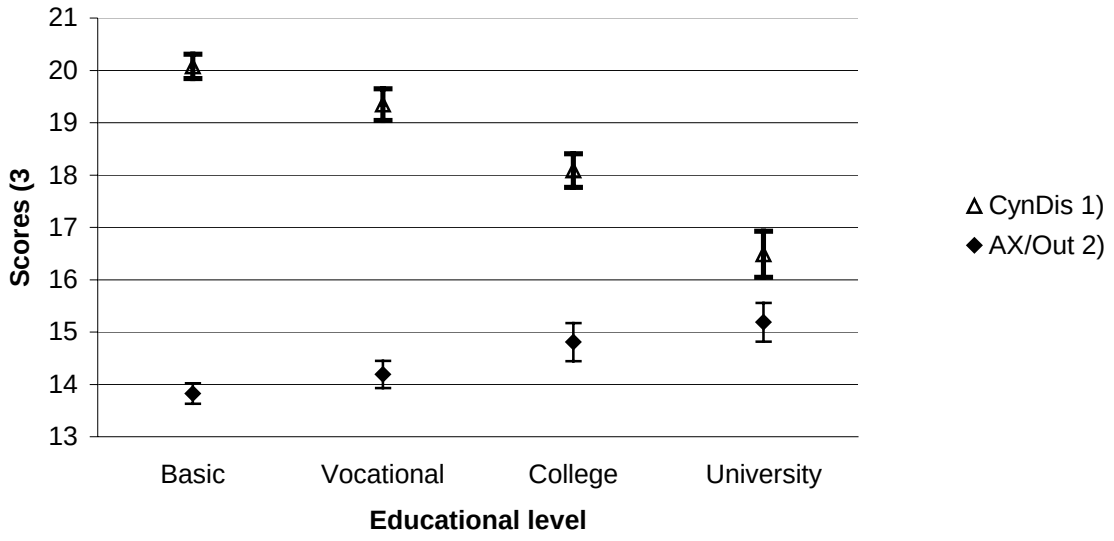

FIGURE 4. Age adjusted means and 95% confidence intervals for Cynical distrust (CynDis) and Anger expression (AX/Out) by educational level.

[1] Educational level: $F(3,3313)=79.3$, $p < .001$, $\eta^2 = .067$
[2] Educational level: $F(3,3316)=20.0$, $p < .001$, $\eta^2 = .018$, [3] Scores min = 8, max = 32 for both scales.

In the *anger expression* scale (AX/Out), respondents with a basic education had lower anger expression scores compared to the respondents with a college or university degree (figure 4). Male respondents in the lower income group also had lower AX/Out scores compared to higher income groups (p =.028, η^2 = .005), but not among women (p =.076, η^2 = .003). Farmers had the lowest AX/Out scores and upper-white collar employees had the highest anger expression mean scores among both genders (p < .001, η^2 = .018, among males, p < .001, η^2 = .016 among females). There were no SES differences in trait anger or anger control. Among females, the less educated had higher anger in scores than more educated females (p < .042, η^2 = .005) but differences were not significant between income or occupational groups.

The anger expression inventory (STAXI), including Anger-Out, Anger-In and Anger-Control scales, starts with the introduction "when I am angry". Therefore, it was reasonable to examine whether the association between SES and different anger expression styles differs in relation to how easily respondents get angry, which was measured with a trait anger scale. There was a significant interaction effect between education and trait anger on anger suppression. Among lower educated women, those who had higher trait anger scores also had higher anger suppression scores (p < .001). Among higher educated women this association was not significant. A similar interaction effect was found among men (p = .029). Educational level also moderates the association between anger control and trait anger among men (p = .005) but not among women. Among the well educated males, those who had higher trait anger scores also had lower anger control scores. Among the lower educated males, the negative correlation between trait anger and anger control was weaker. Education did not moderate the association between trait anger and anger expression (AX/Out) in either gender.

Socioeconomic differences in depressive symptoms were not included in the first article but they are reported here. Beck Depression Inventory (BDI) scores decreased moderately with years of education among males (partial r = -.07, p = .005) and females (partial r = -.06, p = .012) after adjusting for age. Compared to these, correlations with income were higher after adjusting for age (partial r = -.17, p < .001 for men, partial r = -.15, p < .001 for women). According to age adjusted 95% CI, males who had a university degree had lower BDI scores compared to other groups (*p* < .001, partial η^2 =.011). Among females, those who had only a basic education had higher depression scores than women with a university degree (*p* = .015, partial η^2 = .006) after adjustment for age. The group with the

highest income had lower BDI scores than the middle group, which, in turn, had lower scores than the lowest income group among both genders ($p < .001$, partial $\eta^2 = .024$ among male and $p < .001$, partial $\eta^2 = .019$ among female). Between occupational groups, upper white-collar workers had lower BDI mean scores than blue collar workers among both genders ($p < .001$, partial $\eta^2 = .012$ among males, $p = .002$, partial $\eta^2 = .012$ among females).

5.1.2. Smoking cessation related behavior

The second study examined SES differences in smoking cessation related attitudes among current smokers. The distribution of willingness to quit smoking (see section 4.2.3. Figure 3) was similar between both genders; 60% of daily smokers want to quit smoking, 29% indicated that they were not sure and only 11% were *consonant smokers* who did not want to quit. This prevalence of consonant smokers was similar in different educational groups. Smokers in the highest income tertile were less likely to be consonant smokers compared to smokers in the lowest income tertile among men [OR = 0.70 (95% CI 0.52 - 0.94)], adjusted for age-group. Differences in percentages were small; 10% among the highest income group compared with 14% among the lowest income group. The prevalence of consonant male smokers was higher (17%) among entrepreneurs than among upper white-collar male workers (10%). However, blue-collar workers did not differ from white-collar workers in consonant smoking. There were no differences in consonant smoking between blue-collar workers and upper white-collar workers. Among female smokers there were no significant differences in the prevalence of consonant smoking between educational, income, or occupational groups.

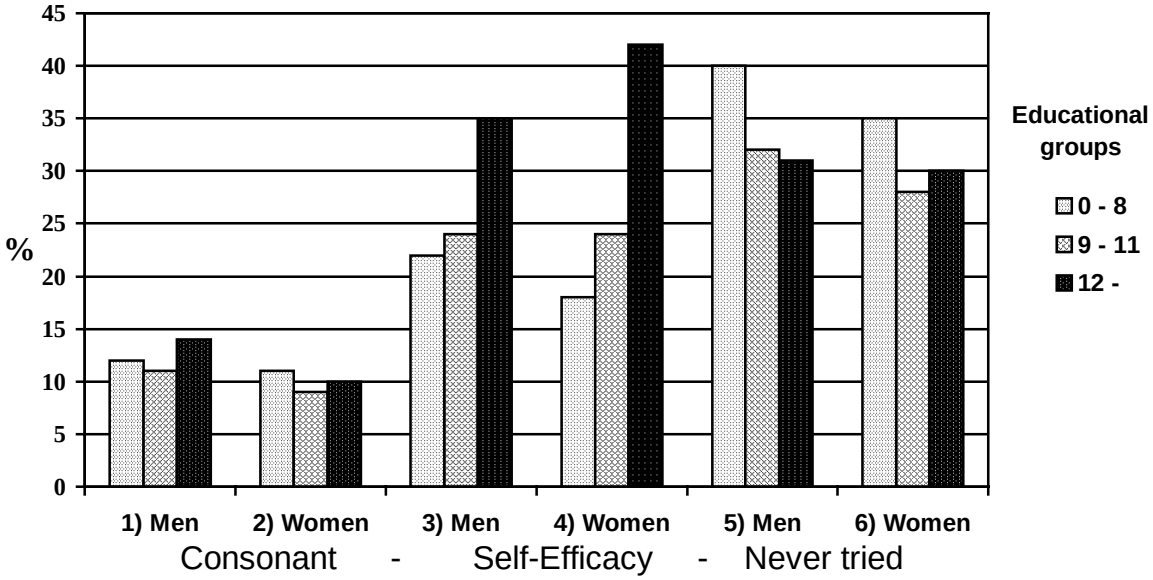

FIGURE 5. Prevalence of smokers who do not want to quit (*consonant*), those who think that they are able to quit smoking (*self-efficacy*), or those who have never tried to quit smoking (*never tried*) by gender and educational group.

1) Men, consonant $\chi^2(2) = 3.5$, p =.171
2) Women, consonant $\chi^2(2) = 0.8$, p =.659
3) Men, self-efficacy $\chi^2(2) = 36.4$, p < .001
4) Women, self-efficacy $\chi^2(2) = 32.2$, p < .001
5) Men, never tried $\chi^2(2) = 19.7$, p < .001
6) Women, never tried $\chi^2(2) = 7.0$, p = .030

Consonant smoking was related to other cessation related behavior. About 60% of consonant smokers had never seriously tried to quit smoking compared to 31% among dissonant male smokers and 29% among dissonant female smokers. About 40% of the consonant smokers suggested that they would be able to quit smoking if they want to, compared to 24% among the dissonant smokers. Among those smokers who participated in the study in 1994, consonant male smokers had a higher nicotine dependence score (p = .005) but among women there were no significant differences between consonant and dissonant smokers (p = .401).

The prevalence of smokers who think that they would be able to quit smoking (self-efficacy) was higher among more educated smokers compared to less educated smokers among both genders (figure 5). When age group, earlier cessation attempts, and amount of smoking were included in the same logistic regression model, the odds ratio for highest compared to lowest education group diminished from 1.83 (95%CI = 1.46 - 2.28) to 1.56

(95%CI = 1.23 - 1.99) among men and from 2.25 (95%CI = 1.68 - 3.01) to 1.80 (95%CI = 1.30 - 2.48) among women. Among male smokers, 21% among the lowest income tertile believed that they would be able to quit compared to 30% among the highest income group ($\chi^2(2) = 15.9$, $p < .001$). Among women, the percentages were 22% and 26% but differences were not significant ($\chi^2(2) = 4.4$, $p = .108$).

Thirty-five percent of male smokers and 31% of female smokers reported that they had never seriously tried to quit smoking. There were more of those who had never tried to quit smoking among less educated male smokers compared to male smokers with more years of education (figure 5). These differences remained significant after adjustment for age [OR = 1.47 (95%CI = 1.20-1.80)]. Among female smokers, differences between educational groups were smaller (figure 5) and were no longer significant after adjustment for age [OR = 1.16 (95%CI = 0.91-1.50)]. Years of education were inversely correlated with the number of cigarettes smoked per day ($r = -.19$, $p < .001$). Among those smokers who participated in the survey in 1994, FTND nicotine dependence scores were inversely correlated with education ($r = -.27$, $p < .001$).

5.1.3. In obesity

In study IV the correlations between education and BMI and WHR are reported. There was negative correlation between years of education and BMI among females ($r = -.31$) and among males ($r = -.23$). Negative correlations with WHR were similar among men and women ($r = -.28$ for males and $r = -.27$ for females). Even when the effect of age was taken into account partial correlations of BMI and WHR on education remained significant among males ($r = -.13$) and among females ($r = -.16$ with BMI and $r = -.13$ with WHR).

5.2. Depressive symptoms and hostility in relation to:

5.2.1. Smoking cessation related behavior

In the third study, the association between depressive symptoms and smoking behavior was examined. Current smokers had higher depression scores than former and never smokers among both genders. These differences remained significant after adjustment for age and years of education ($p < .001$, for both men and women). Further, depression scores

correlated positively to the number of cigarettes smoked per day in both genders (r = .17, p < .0001, for men, r = .22, p < .0001, for women).

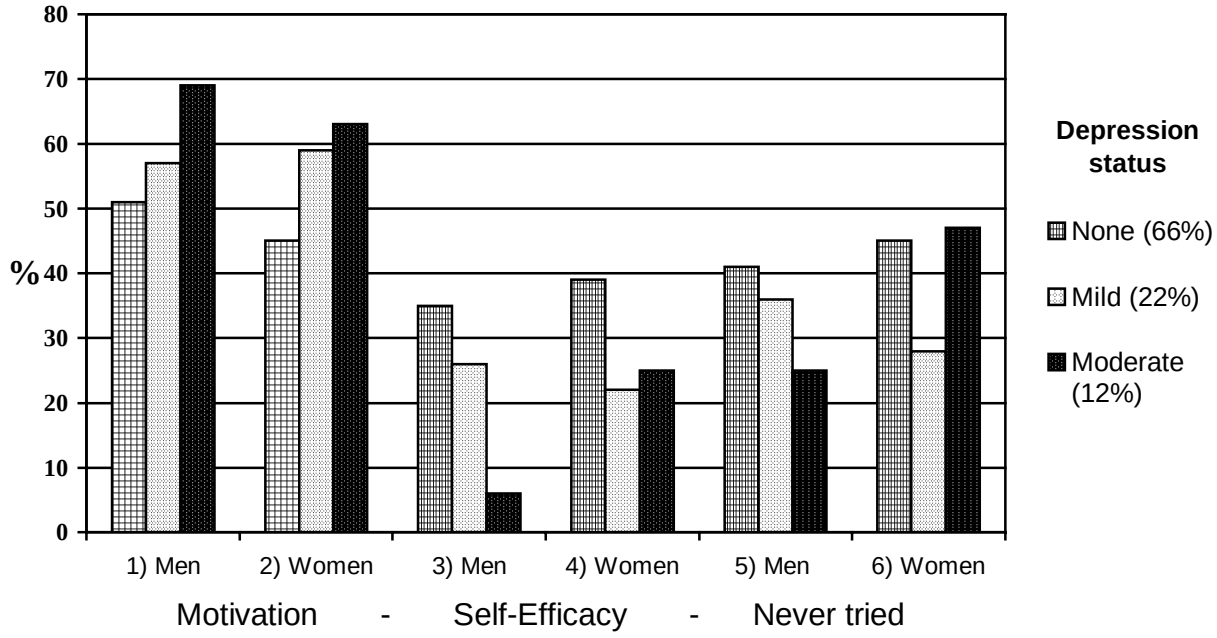

FIGURE 6. The prevalence of those who want to quit smoking (*motivation*), think that they are able to quit (*self-efficacy*), and have never tried to quit smoking (*never tried*) by depression level.

1) Men, motivation $\chi^2(2) = 5.7$, $p < .058$
2) Women, motivation $\chi^2(2) = 8.7$, $p = .013$
3) Men, self-efficacy $\chi^2(2) = 19.5$, $p < .001$
4) Women, self-efficacy $\chi^2(2) = 10.9$, $p = .004$
5) Men, never tried $\chi^2(2) = 5.3$, $p < .071$
6) Women, never tried $\chi^2(2) = 9.4$, $p = .009$

The main interest was to examine whether depressive symptoms were significantly related to cessation related attitudes. Female smokers with higher depressive symptoms were more likely to report that they would be willing to quit smoking (Figure 6). When depressive symptoms were used as a continuous variable this association remained significant even after controlling for age, education and the amount of smoking [OR = 1.57 (95%CI = 1.21 - 2.04)]. Among male smokers, depressive symptoms were not related to the motivation to quit smoking. Smaller proportions of smokers with depressive symptoms thought that they would be able to quit smoking compared to those smokers who did not have depressive symptoms

(figure 6). This difference also remained significant when using depressive symptoms as a continuous variable after age, education was taken into account [OR = 0.63 (95%CI = 0.45 - 0.90) among males, and OR = 0.78 (95%CI = 0.50 - 0.95) among females]. Depression scores were not related to whether or not a smoker had made previous cessation attempts. However, among mildly depressed female smokers there were less smokers who have not tried to quit smoking compared to those who were non-depressed or moderately depressed (figure 6).

Current smokers had significantly higher cynical distrust scores among both genders. After adjustment for age and years of education differences became non-significant among females. Among current smokers cynical distrust scores were moderately correlated with the numbers of cigarettes per day among both genders (r = .11, p = .012 among men, r = .15, p = .002 among women). Compared to depressive symptoms, cynical distrust scores were not related to motivation to quit smoking in either gender. There were an equal number of smokers who wanted to quit at all levels of cynical distrust. When age and years of education were used in the same logistic regression model, cynical distrust scores did not predict motivation to quit [OR = 1.01 (95%CI = 0.96 - 1.05) among men, OR = 1.02 (95%CI = 0.98 - 1.06) among women]. The self-efficacy, the experience of one's own ability to quit smoking, was the only variable related to hostility. Among male smokers who have higher cynical distrust scores, there were only 21% of those who thought that they would be able to quit smoking compared to 48% in the low cynical distrust group. Among female smokers cynical distrust scores were related to lower self-efficacy in cessation [OR = 0.96 (95%CI = 0.92 – 0.99)], but unlike male smokers these differences did not remain significant after adjustment for age and education. Cynical distrust scores did not predict lack of earlier cessation attempts among either gender [OR = 0.99 (95%CI = 0.96 - 1.04) among men, OR = 0.98 (95%CI = 0.94 - 1.03) among women].

5.2.2. BMI and WHR and weight changes

Depressive symptoms were positively correlated with higher BMI (r = .10) and WHR (r = .17) among males. Correlations among females were similar (r = .11 with BMI, and r = .15 with WHR). After adjustment for age the correlations between BDI and BMI weakened notably (partial r = .05) as did the correlation with WHR among both genders (partial r = .10). Compared to the associations with depressive symptoms, correlations between CynDis scores and BMI were slightly higher (r = .15 among men, r = .20 among

women) and with WHR (r = .18, and r = .17, respectively). The correlation between WHR and BMI among men was r = .66 and for women r = .62.

Analysis of covariance (ANCOVA), with adjustment for age showed that cynical distrust varied significantly with BMI groups among both genders so that the obese group (BMI > 30) had higher means in CynDis than all other groups among men (Figure 7). Obese females had higher CynDis scores than females who were at most mildly overweight (BMI < 27) (figure 7). In a corresponding analysis of BMI and BDI, obese men and women had higher BDI scores than normal weight respondents (BMI< 25) after adjustment for age (F=(3,1479) = 5.1, p = .002, partial η^2 = .01 for men, F = (3,1746) = 2.8, p = .038, partial η^2 = .005 for women).

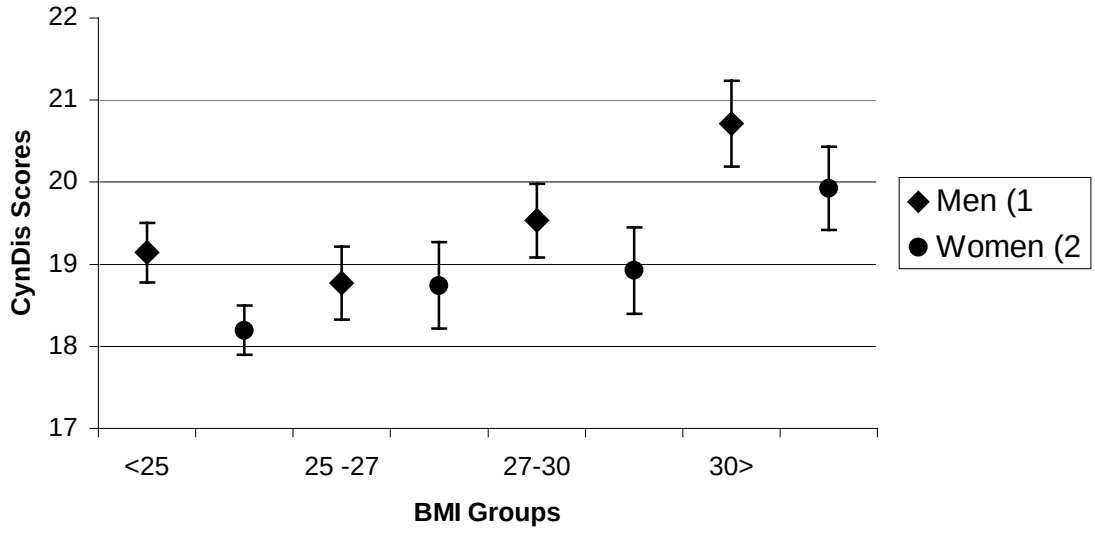

FIGURE 7. Age adjusted Cynical Distrust (CynDis) scores by BMI groups among men and women.

1) Men: F (3,1503) = 11.3, p < .001, partial η^2 = .022
2) Women: F (3,1808) = 10.6, p < .001, partial η^2 = .017

In the final study (V), weight changes were examined in a 3-year follow-up study among 284 middle-aged (45 to 64 years old) participants from North-Karelia. Psychosocial measures were done both in 1992 and 1995 and test re-test correlations between two assessments were made for BDI (r = .70, P < .001) and cynical distrust (r = .57, P < .001). The participants in this age-group were mostly overweight, 33% of the women and 29% of the men had BMI's over 30. During the follow-up, 8% of the women had lost more than 1 BMI unit and 15% had gained more than 2 BMI units, among the men, the respective proportions were 13% and 11%.

The male weight gainers (> 2 BMI units) had higher mean depression scores than other males (figure 8), but the women weight losers (> 1 BMI unit) had the highest mean depression scores (figure 8). The change in BDI scores from 1992 to 1995 or change in CynDis scores between these assessments were similar in all weight change groups.

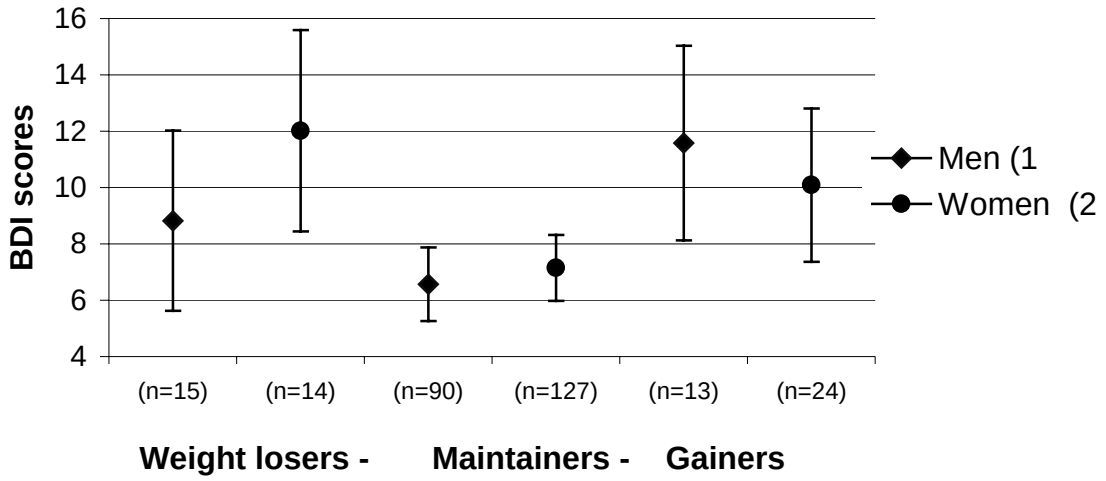

FIGURE 8. Age adjusted BDI mean scores and 95% confidence intervals by weight change groups and gender among middle-aged men and women.

1) Men, F (2,114) = 4.0, p = .020,
2) Women, F (2,161) = 4.7, p = .010

When age, gender and baseline BMI were adjusted for, higher depression scores predicted weight gain (BMI change > 2) when weight maintainers were used as the reference group. Depressive symptoms also predicted weight loss, after adjustment for age, gender and baseline BMI [OR = 1.11 (95%CI = 1.02 - 1.20)]. When all baseline predictors and change in depression scores were in the model, baseline depression scores and an increase in depression scores both remained significant predictors of weight loss (data not shown here). CynDis scores did not predict either weight gain nor weight lose.

5.3. How socioeconomic factors modify the relationship between psychological traits and lifestyle indicators

In relation to cross-sectional results, it was examined if the effects of depressive symptoms and cynical hostility on obesity as measured by WHR and BMI differed according to educational level. All variables were used as continuous in setwise hierarchical multiple regression (Cohen & Cohen, 1983). Both higher BDI scores and cynical distrust scores

predicted higher BMI and WHR after age and education were in the model, and the partial regression coefficients were similar in all models among both genders. The only significant interaction between education and CynDis for BMI was found among women. Cynical distrust scores were not related to BMI among higher educated women while there was a positive correlation among less educated females ($p = .033$). A similar interaction between Cynical Distrust and education found with WHR ($p = .042$).

Factors, which may explain why some persons with depressive symptoms gain weight and some lose weight, were examined in the follow-up study. This was examined with interaction terms between depression scores and other factors such as age, gender, baseline BMI, or education. Only the interaction between education and depression scores improved the prediction of weight change among women ($p = .001$). Women in the least educated group lost weight more when depressive symptoms increased while women in the most educated group gained weight more when depressive symptoms increased. In a similar model, there were no significant interaction terms for the hostility score that would have improved the prediction of weight change for either gender (data not shown).

6. DISCUSSION

6.1. Main results

One of the aims of this study was to examine SES differences in psychosocial factors. The main result in study I was the divergent association between hostility measures in relation to socioeconomic status. Cynical hostility scores were lower among higher SES participants while anger expression (Ax/Out) scores increased moderately with SES. Respondents with higher SES had somewhat less depressive symptoms than in lower SES groups. In relation to smoking cessation (study II), there were no socioeconomic differences in motivation to quit smoking but smokers in higher SES groups were more likely to believe that they would be able to quit smoking (self-efficacy). Furthermore, among higher SES male smokers there were more of those who had tried to quit smoking earlier. Both males and females in lower SES groups had higher obesity levels according to both BMI and WHR (study IV).

Another aim was to examine how psychosocial factors were related to smoking cessation related attitudes and obesity. Depressive symptoms were related to lower self-efficacy in smoking cessation (study III). However, there was higher motivation to quit smoking among female smokers with elevated depressive symptoms (study III). Cynical hostility scores were expected to relate to a lower motivation to quit but they were related only to lower self-efficacy in cessation. Higher depressive symptoms and cynical hostility scores had a moderate positive correlation with obesity measures BMI and WHR (study IV). In study V, it was found that depressive symptoms predicted both weight gain and weight loss in a 3-year follow-up among middle-aged respondents. The cynical distrust scores were not related to weight changes in same study.

Before examining how SES moderates the association between psychosocial factors and health indicators, SES had an interesting moderation effect on hostility measures. In the low SES group, those who got angry more easily (trait anger) were more likely to suppress their anger (Ax/In) while among high SES groups this correlation was not so strong (study I). Among higher educated males, those who got angry more easily were less likely to control their anger compared to low SES males. In study III, education did not diminish the association between depressive symptoms and cessation related attitudes. In study IV, there was an interaction effect between obesity measures and cynical distrust among females. BMI

and WHR were not related to cynical distrust among more educated females while among less educated females there was a clear correlation. In study V, depressive symptoms were related to weight loss among less educated middle aged women while among more educated women depressive symptoms predict weight gain three years later.

6.2. Validity of this study

The strength of this study was the large representative population sample that allows comparisons between socioeconomic groups. Furthermore, it is still relatively uncommon to have a sample of both males and females as it was in this study. The response rate was acceptable despite the demanding study protocol where the psychosocial questionnaire was given after other questionnaires and health examinations were done. Response rates were also high between the different years of annual health behavior surveys in study II. To examine the small number of consonant smokers, who are not likely to participate in any smoking cessation programs, it requires a large population-based study. On the other hand, a large sample size may cause even small differences or associations to become statistically significant and therefore other indicators than p-values are needed. Strength of power was reported in these studies as recommended by Wilkinson et al (1999) but it is still uncommon and therefore difficult to comprehend for many readers. With some indicators, such as weight, it is appropriate to examine actual differences to reflect the importance of difference. Measures like hostility are abstract concepts and the impact of the difference is more difficult to estimate.

Assessment of depression and hostility was done with measures that have been validated in earlier studies. The 8-items of the cynical distrust scale were supposed to measure only one cognitive dimension, cynical attitudes and distrust of other people, which makes it easier to interpret than the original Cook-Medley Ho scale. Spielberger's anger expression scales were used only in the first study as later studies concentrated on the cognitive dimension of hostility. The Beck depression inventory includes 21-items and other studies have found three different, though highly correlated factors (Tanaka & Huba, 1984). However, in this study BDI was used as a single measure in the present study as has been done in most studies.

Indicators of motivation and self-efficacy in smoking cessation were based on a single question. However, questions were relatively straightforward and easy to understand. The more difficult part was the lack of variation in alternatives. First, it was difficult to

understand why 30% of smokers were not able agree or disagree (‘not sure’) to the question “do you want to quit smoking?” Some respondents may interpret the question of cessation assuming that willingness requires the ability to quit smoking. The social desirability of smoking cessation may also affect some consonant smokers to reply “not sure”. Second, there is lot of variation among those more than 50% of smokers who said they would like to quit smoking. Finally, relating to those 11% who say that they do not want to quit smoking, it was not possible to know the reasons for this attitude. According to Winter (1973), motives are a way to explain behavior that is not explained by external forces alone. Motives are related to more general dispositions. However, it is not clear if negative attitudes towards smoking cessation relate to negative health related attitudes in general, especially as smoking is an addictive behavior that may create more complicated attributional styles. Smoking is still rewarding for many smokers (Hughes, 2001) and there are many factors like physical and psychological withdrawal symptoms that encourage smokers to maintain their habit even if they are aware of health consequences. Motives usually include goals for behavior, in this instance to quit smoking. However, it was not possible to “validate” this by looking at how many of the motivated smokers really tried to quit smoking. The self-efficacy of cessation was also based on a single question. There are several widely used behavior change models that include the self-efficacy concept (Bandura, 1986; Ajzen, 1986) but the question used in this study was not developed according to these models. In earlier studies a single item question on self-efficacy has been found to be a relatively valid measure compared to more extensive self-efficacy measures in smoking cessation among those who try cessation (Shiffman et al., 2000). However, among consonant smokers who did not want to quit, there were more smokers who believed that they would be successful in cessation. These results indicate that there was optimistic bias in one’s own estimation, as consonant smokers were more addicted. This optimistic bias was not necessarily distributed equally between SES groups.

One suggest of this study was the requirement to include social context in the research when examining psychosocial factors, such as hostility, smoking cessation or weight related behaviors. However, only individual SES indicators were used while more context specific measures, such as neighbourhood SES (Krieger, Williams, & Moss, 1997), would have been important to examine. Neighbourhood SES seems to have an independent effect on smoking behavior in a British study (Duncan, Jones, & Moon, 1999). In addition to the lack of social context in these studies, perhaps a more general problem is the lack of cultural

context. Findings from study subjects of people of other countries that deal with physiological aspects of the cardiovascular system are easy to generalize. However, rules regarding which emotions can be expressed and when and at what strength vary greatly between cultures (Ekman, 1972). Therefore, generalizations regarding anger expression from one culture to other must be made with care. Similar cultural differences exist with smoking and especially with obesity. However, these are not discussed in this dissertation.

Discrimination against obese people has been discussed extensively but there was no indicator about experience of any discrimination. Even if there has been discrimination, there is no reliable way to assess what have been the real consequences. In the follow-up study, there was no information on whether the respondents had dieted during the follow-up. At the baseline those who had dieted earlier did not have higher depression scores. The small sample size in the follow-up study V had several shortcomings and one was the use of low limits for weight loss. However, other studies with large samples have also used low limits, such as 2,3 kg (5 lbs), and found that, this level of weight loss improves well-being (Fine et al., 1999). However, non-significant findings from study V may also indicate lack of statistical power rather than negative results.

Examining interactions are part of the common statistical procedure to test assumptions of analyses. Regression models assume that the effects of dependent variables are additive so that the combination of two or more variables do not explain more than the main effects. The problem is when to report possible interactions (or lack of interactions) as significant results. As with main effects, there is a danger with big samples to make a type I error by accepting the interaction effect that is random by nature or a type II error by rejecting the real interaction effect. In this study, there were several statistical tests for interactions and some of them were significant. One solution suggested by Judd, McClelland, and Culhane (1995) is to test interaction contrasts that are based on some theoretical assumption. Creating specific interaction contrast also diminishes type II errors. Some of the significant interactions, like respondents who get easily angry, suppress that anger, more likely among the lower educated group, have some theoretical basis. However, the best validation for results is still to find similar results from other studies.

6.3. Socioeconomic differences in psychosocial measures

The most essential concerns regarding hostility have been the assessment of hostility and the role of social contexts in hostility (Barefoot 1992; Smith 1992). Dispersion

of the assessment of hostility is still evident today and socioeconomic differences of hostility measures have not been properly examined. Study I found that there were differences in hostility measures between SES groups and these associations were divergent between different hostility measures. Cynical distrust scores were higher among those who were in a lower position according to SES indicators. Contrary to this, those who have higher SES were more likely to report that they express their anger when they are angry. Since both measures, cynical distrust and anger expression (AX/Out), are widely used hostility indicators, it raises the question of how appropriate the use of one wide concept of hostility is in health inequalities studies. Different results underscore the importance of examining more carefully what is the nature and the content of certain hostility measures. When a more accurate definition has been given, there must also be a better explanation for a possible mechanism of how this dimension of hostility is related to health. Dimensions of anger expression measure how a person expresses angry emotion to others. Cynical distrust scale requests respondents to rate how trustful the human nature is in general. In this way, cynical distrust is more like cognition and less related to emotion. These differences should be visible when explaining how social position is related to some hostility dimension or how certain dimension hostility is related to a health indicator.

The inverse association between indicators of SES and the cynical component of hostility has been shown in earlier studies (Kubzanky et al., 1999; Lynch et al., 1997; Marmot et al., 1991; Scherwitz et al., 1991). Recently, the discussion has been related to what kind of conclusion can be drawn from this association. In cardiovascular research, hostility has been mostly treated as an individual permanent trait developed during childhood (e.g., Siegman 1994; Williams 1998). Adverse and hostile childhood environments have been shown to promote hostile attitudes later in life (Mathews et al., 1996; Räikkönen et al., 2000). However, a moderate correlation with age, which has been found in other studies as well (Scherwitz et al., 1991), indicates that cynical distrust is a construct that varies throughout one's life course. This still needs confirmation in longitudinal studies. Adverse negative life events such as unemployment (Kortteinen & Tuomikoski, 1998) may also create distrust in other people and cynicism. In study IV it was suggested that higher cynical distrust scores among obese persons could partly be caused by discrimination against these people. Adverse negative experiences, like unemployment or divorce, are likely to cumulate among people in lower socioeconomic groups (Jalovaara, 2001; Martikainen & Valkonen, 1999).

There were no SES differences in trait anger, anger suppression or anger control but a more unexpected finding was that anger expression (AX/Out) scores were higher among respondents who had higher SES. An erroneous belief in health inequality studies is that all health related factors, including psychosocial ones, are worse in lower SES groups (Muntaner, Lynch, & Oates, 1999). According to Siegman (1994), anger expression is one key factor in hostility that is negatively related to health. In laboratory settings, it is often found that expression of anger has adverse physiological consequences (Houston, 1994). These settings do not usually include the social context of anger assessment. In relation to the finding with anger expression (study I), Schieman (2000) also found that well educated people were more likely to describe their angry reaction as appropriate, however they were less likely to display anger in that study. Since one hypothesis is that social power gives one the opportunity to show anger, higher anger expression scores among more educated people may reflect higher self-confidence to express anger when it is necessary. Furthermore, despite the fact that the trait anger scores were similar by SES it modifies other anger expression scales. Among the lower educated, those who were more likely to get angry were also more likely to suppress their angry emotion but among high SES group there were no such correlations. Among higher educated males, those who have higher trait anger scores had lower anger control scores. In general, respondents in higher social positions seem to be more capable of expressing their angry feelings when they get angry. Other studies have questioned the validity of anger out scale as an indicator of aggressive behavior as well. Anger out has been shown to be unrelated to angry behaviors as reported in diaries (Martin & Watson, 1997) and not related to facial expressions rated by trained coders (Brummet et al., 1998). These results indicate more complex models of hostility and anger expression than earlier studies suggest.

Depressive symptoms were expected to relate inversely to SES. Some earlier studies have found this with depressive symptoms (Lynch et al., 1997; Stansfeld et al., 1997) but there have been other studies, including Finnish samples, that have found no clear association between diagnosed depression (Coyne & Downey, 1991; Isometsä, et al., 1997; Lehtinen & Joukamaa, 1994; Lindeman et al., 2000). In this sample, depressive symptoms were more prevalent among respondents in lower SES. An interesting finding was that depressive symptoms had stronger association with income than education, which has also been found in other Finnish samples (Lindeman et al., 2000). This may be a random finding, but it could also indicate that income measures some aspects of social stratification that is

especially related to depressive symptoms. According to Mirowsky and Ross (2001), economic hardship is related to depressive symptoms especially in younger age cohorts. Lynch, Kaplan and Schema (1997) found little support for the argument that depression leads to economic problems but in their study it appeared that those who were under continuous economic hardship between 1965 and 1983 had a higher risk for clinical depression in 1994. In the U.S. national comorbidity survey, anxiety disorders were more powerfully related to SES than affective disorders including depression (Kessler et al., 1994). This was interpreted in the light of the idea that resources related to higher SES were more protective against worries and fears than sadness (Kessler et al., 1994). In this study, the differences in depressive symptoms were moderate compared to cynical distrust. Freden (1982) has questioned why depression seems to be relatively independent of social class? Among other things, he proposed that upper social classes are subject to high expectations regarding success and it makes them as vulnerable to depression as lower social classes who usually face more negative life events (Freden, 1982). Further studies should use SES as etiological factors and take a closer look at different preventive or risk factors for depression between SES groups.

6.4. SES differences in smoking cessation

One of the basic explanations for SES differences in health has been poorer health behavior among low SES groups, usually without explanations of why this should be so, or explorations of mechanisms. In public discourse, this has sometimes been used as an example of the lack of personal responsibility for their own health among low SES groups. One of the most “irresponsible” examples of incautious lifestyle is if the smokers do not even want to quit smoking, labelled in this study as consonant smoking. However, only 11% of smokers did not want quit smoking and this prevalence was similar among all SES groups. Male smokers in the lower income group were more likely to be consonant smokers but the actual difference between them and the higher income group was only four percentage points. Among female smokers, there were no SES differences in consonant smoking. Nor have other studies using a consonant smoking indicator (Eiser et al., 1978; Goldstein, 1997) or intention to quit, found differences between SES groups (Ngyuet et al., 1998, Owen et al., 1992). Comparisons of consonant and dissonant smokers in studies where intention to quit have been used have to be made with caution. In a similar survey to that of study II, during 1997 and 1998 (Helakorpi et al., 1998) only 15% of those smokers who were unsure and 65%

of those smokers who would like to quit had an intention to quit within the next 6 months. The rest of the smokers from those groups and the consonant group belonged to precontemplators. One would expect that the norm to quit smoking would be higher among higher SES members where smoking is less prevalent. Another explanation may include the dynamics of smoking cessation. Motivated smokers among higher SES groups may have been more successful in smoking cessation than motivated smokers in low SES groups. This may have left more unmotivated smokers in high SES groups compared to the lower SES groups.

Another predictive attitude for smoking cessation, self-efficacy, was found to relate to SES. Smokers in a lower socio-economic position were less confident that they would be able to quit smoking if they were to try. The difference was more than ten percentage points between the most educated and least educated group. Smokers in low SES groups also smoked more cigarettes and had higher nicotine addiction scores. Therefore the lack of self-efficacy can reflect the real difficulties from earlier cessation attempts. Still, after controlling for these differences, smokers in the less educated group had lower self-efficacy. Lower self-efficacy in smoking cessation is likely to contribute to socioeconomic differences in smoking cessation. Self-efficacy has proven to be an important predictor of successful smoking cessation trials (Shiffman et al., 2000). In large smoking cessation trials, there have not been any socioeconomic differences in smoking cessation rates (Monso et al., 2001). This may indicate that if low SES smokers could be encouraged to try smoking cessation with similar access to replacement therapies as high SES smokers differences could be small even when it seems that low SES smokers are more addicted.

6.5. Psychosocial factors in relation to smoking cessation related factors

The main finding in the third study was the lower self-efficacy in smoking cessation among smokers with elevated depressive symptoms. This has been proposed as one mechanism between depression and smoking cessation (Carmody, 1989; Hughes, 1988) but it has not really been examined in the general population of smokers. In smoking cessation trials, two studies (Hall, Munoz, & Reus, 1991; Lerman et al., 1996) did not find any association, while in a third study (Kinnunen et al., 1996) there was a similar association as in the present study. Smokers usually enter smoking cessation groups because they have not been able to quit on their own. The restricted range of variation in cessation trials between depressed and non-depressed smokers may contribute to the non-significant findings. Lower self-confidence in quitting can be realistic because depressed smokers seem to have more

withdrawal symptoms (Shiffman et al., 1982). In this sense, a pessimistic view of one's own abilities to quit is not necessarily a by-product of negative thinking. It might reflect what Alloy and Abrahamson (1988) termed depressive realism, where evaluations between internal and external control over situations are more congruent among depressed people than those who are non-depressed.

Another important finding was related to motivation to quit smoking. Female smokers with higher depression scores were more willing to stop smoking. Among men a similar trend was not significant, which makes it difficult to conclude real gender differences. Essential symptoms in depression are indecisiveness and lack of energy. According to these symptoms, enrolling in demanding cessation groups would not be expected. However, many smoking cessation trials have reported a high prevalence of smokers with a history of depression (Glassman et al., 1988) and elevated depressive symptoms (Kinnunen et al., 1996). Elevated rates of depressed people in cessation trials imply that higher motivation to quit, found in this study among all smokers, may lead to actual attempts to quit smoking. It may also indicate that the non-depressed are more likely to quit on their own while smokers with depression or depressive mood seek support in their cessation attempt. The first population studies found that smokers with depressive symptoms are less likely to quit (Anda et al., 1990) but there have been other studies that have not found this association (Breslau et al., 1998). Female smokers who were depressed were actually more likely than non-depressed females to be abstinent at a three-year follow-up (Salive & Balzer, 1993). Despite the fact that depressive smokers have more withdrawal symptoms and lower self-efficacy, they may have tried quitting more often and this may level off the other differences in smoking cessation.

Some of these associations, such as cessation motivation and depressive symptoms, were stronger among females but there were no significant interactions by gender. In addition, in a study by Anda et al. (1990) the cessation rate was similar among men and women. In this study (III), there was no significant interaction between depression and gender with earlier cessation attempts. Therefore, strong conclusions about differences between genders in depression and smoking behaviour can not be made. However, recent reviews have tried to answer why cessation seems to be more difficult for women even if they smoke less than male smokers (Perkins, 2001; Pegan et al 2001). One explanation that has been expressed is that there might be a stronger role of negative affect smoking among females.

Education was used in this study only as a controlling variable. Higher depression scores among the current smokers remained significant when the effect of education was taken into account. Son et al. (1997) found among young adults that the difference in depressive symptoms diminished when differences in education between smoking status groups was taken into account. However, a competing hypothesis between socioeconomic indicators and psychological indicators is not appropriate. More likely both have their own impact on smoking cessation but higher depressive symptoms among lower SES groups can also be one small partial explanation as to why smoking prevalence is higher among these groups.

Cynical hostility was related to lower self-efficacy in smoking cessation but there was no relation to motivation to quit smoking. It was expected that cynical attitude would reflect lower motivation toward one's own health. However, hostility is about distrust towards other people, not necessarily towards self or one's own health. As cynical distrust was related to the number of cigarettes smoked daily, this would indicate higher addiction among more hostile smokers. Recent studies on negative affect have shown that nicotine replacement may reduce feelings of anger after cessation (Jamner, Shapiro, & Jarvik, 1999). However, results relating self-efficacy may indicate that cognitive aspects of hostility may have an important effect in earlier phases of smoking cessation as well. Compared to depression, little has been done with hostility or other aspects of the negative affect concept. Further studies should not only look at hostility or depression as affective states but also cognitive structures and their effects on smoking behaviour. There have been no earlier studies that have examined cessation related attitudes and hostility among smokers. The negative affect concept should also include hostility and anxiety in future studies.

6.6. Psychosocial factors and SES in obesity

One of the reasons for examining weight changes and psychosocial factors arose from the hypothesis that higher stress among low SES members is related to higher central obesity in these groups compared to higher SES groups (Björnthorp, 1991). As expected, lower SES respondents had higher BMI and WHR levels. Correlations were slightly higher among women than among men. A recent review of results of obesity trends and associations with SES, including this 1992 study, are reported in the dissertation by Lahti-Koski (2001). Other discussions have examined if depressive symptoms have a stronger effect on WHR as an indicator of central obesity than on BMI. The association

between WHR and depressive symptoms was slightly stronger than the association between BMI and depressive symptoms (IV). A similar moderate association with BMI and WHR was found here as in some earlier studies (Wing et al., 1991), but there are also studies that have not found this association, (Georges et al., 1993; Rotchschild et al., 1989). However, in relation to the low strength of the associations (e.g., Rosmond et al. 1996), these kinds of results cannot be treated as proof of different mechanisms between the central obesity and BMI with depression. There must be a more powerful research design than cross-sectional surveys to examine this kind of hypothesis, as suggested by Friedman & Brownell (1995). Furthermore, Björnthorp's (1991) original hypothesis that depression is a mediator for SES differences in central obesity is difficult to prove. First, it expects that higher stress among lower SES members will lead only to higher depressive symptoms. Second, depressive symptoms also include weight loss. In the introduction, several possible effects between obesity, SES and depression were reviewed, but cross-sectional results between these three measures do not prove causal relations.

The association of obesity measures with cynical hostility were stronger than with depression. In addition, in earlier studies individuals with higher relative weight had higher hostility scores (Houston & Vavak, 1991; Siegler et al., 1994) but non-significant associations have also been presented (Koskenvuo et al., 1988). One study among young adults found an association between WHR and cynical hostility but not with body mass index (BMI) (Sherwitz et al., 1992). Among older males, seven hostility dimensions, except social avoidance, had moderate association with both WHR and BMI (Niaura et al., 2000). The positive correlation between cynical distrust and obesity, whether measured with BMI or WHR, is usually interpreted as a consequence of worse health behavior among those with higher cynical distrust scores. These same cross-sectional results can be related to discrimination consequences, especially among females. Since earlier studies have concentrated on depression as a possible consequence of discrimination, the result relating to cynical distrust is interesting. If an obese person frequently encounters negative attitudes from others this could not only lead to negative views concerning one´s *self*, as in depression, but also a negative view of *other* people. Respondents with high hostility scores see others as dishonest, unreliable, and only concerned with their own interests. In relation to the functional perspective of emotions, a certain level of cynical distrust may be considered a protective coping mechanism to counteract the retribution of others among obese persons. Further, the moderation effect of education may also be related to the discrimination

interpretation. One possible reason why cynical distrust scores among higher educated females did not correlate with obesity is because higher educated obese people have had some success, at least in their educational career, that might have made better educated obese respondents less cynical.

Overall, the associations between psychological factors and other variables were practically similar between men and women. This was not what one would have expected because of the different meaning of weight and body shape to men and women (Hoffman & Brownell, 1997) and the different role of depression in that concern (Joiner, Schmidt, & Singh, 1994). On the other hand, cross-sectional associations between depression and WHR have been similar among men and women in other studies as well (Lloyd, et al., 1996). It is expected that discrimination may have more severe effects at a younger age than in an older age when the obesity is more common. Further, as social consequences of obesity were more severe among females than males (Sarlio-Lähteenkorva & Lahelma, 1999), one would expect that the association between depression and obesity would be stronger among females. Despite the similar associations between men and women on these factors, the causes of these associations are not necessarily the same among men and women.

The main finding in study V was that depressive symptoms predicted both weight gain and weight loss. While both these symptoms have been shown to be prevalent among depressed persons, there have been only a few studies that examined weight changes in the general population. Depressive symptoms and weight gain have been found in earlier studies (DiPietro et al., 1992; Noppa & Hällstöm, 1981) as in the present study. However, weight loss was also related to elevated depressive symptoms and an increase in depressive symptoms during the follow-up. These were more unexpected findings despite the fact that there are earlier reports on similar results for some subgroups (DiPietro et al., 1992). In one retrospective study, women recall unintentional weight losses in relation to stress or depression (French, et al., 1995). Among nursing home residents, depressive symptoms and two or more chronic diseases predict weight loss (Blaum, Fries, & Fiatarone, 1995). There may be unmeasured factors that may cause both an increase in depression and weight loss during the follow-up.

A more ambitious task was to explain why some respondents with depressive symptoms gain weight and others lose weight. The only significant interaction effect was between depressive symptoms and education among women. Women with depressive symptoms in the least educated group were more likely to lose weight but women with

depressive symptoms in the most educated group were more likely to gain weight. DiPietro et al. (1992) reported a similar tendency, although not significantly, among women below 55 years. However, there were no clear answers in relation to direction of weight change with depressive symptoms that may relate to a small sample size as well.

Cynical hostility, or a change in the cynical hostility score, was not related to weight change. Two earlier studies that established an association among men assessed hostility in young adulthood (Siegler et al., 1992; Ravaja et al., 1996). It is possible that there are different psychological factors causing weight change in young adulthood than in middle age. Other studies conducted among men (Siegler et al., 1992; Ravaja et al., 1996) have used different hostility measures than this study did and this might be another reason for different results among men. In a recent twin study from Sweden, cynicism predicted WHR among middle-aged men and women, anger predicted WHR in males and depression was related to WHR only in middle-aged females (Nelson, Palmer, Pedersen, & Miles, 1999). Compared to findings on depressive symptoms, it seems that hostility is not so important a psychosocial factor in relation to weight changes. One reason for this might be that cynical hostility is expected to reflect a cognitive component, cynical beliefs and mistrust in others (Barefoot & Lipkus, 1994). This kind of cognitive aspect has less connection to weight changes than depression, which might include emotional, cognitive and somatic symptoms, many relating directly to weight related behaviour.

6.7. The role of psychosocial factors in health and health inequality studies

According to its definition, a psychosocial factor is a concept that reflects the social environment around an individual but it is also an individual factor that creates variation between individuals in the same social environment. Depressive symptoms and cynical hostility were chosen as psychosocial factors for this study more through exclusion of other variables than from some theoretical basis. However, the different background of these two psychosocial factors created an interesting comparison that reveals some of the pitfalls in the current use of psychosocial factors. Current models represent psychosocial factors as a pathway towards how socioeconomic status effects health inequalities (e.g., Adler et al., 1994; Marmot, 1999). However, these pathway models do not clearly explain why SES differences in health exist, only how they might be mediated (Kaplan 1995). Further, if adverse environments cause poor health (Taylor & Repetti, 1997), there are no explanations for how people are selected to these environments or, how these environments become better

or worse. Even if these topics are outside health psychology there are other problems. Spicer and Chamberlain (1996) have criticized the current status of health psychology as "flowcharting" theorising. By this, they mean models that use concepts like SES, blood pressure, alcohol consumption or anger as boxes and that arrows between these boxes/variables are based on empirical associations (Spicer & Chamberlain, 1996). These kinds of models omit the qualitative differences between association between physiological, social and psychological concepts i.e. an arrow from SES to alcohol consumption is a different kind association than an arrow from alcohol consumption to blood pressure. The epidemiological approach, i.e. trying to find independent association between variables, mixes three different levels; theoretical, measurement and statistical models (Spicer & Chamberlain, 1996). Psychological theories are replaced by description of variables, such as anger expression from mild irritation to rage. Causal processes are sometimes diminished to statistical associations between social position, psychological factors and health (Spicer & Chamberlain, 1996). In relation to this, there is a lack of sufficient theory on how psychosocial factors are related to socioeconomic status (Kaplan, 1995). In study I, there was some move towards this kind of theory by trying to find answers as to why there are certain associations and what function these psychosocial factors may have. Instead of creating new psychosocial factors, incorporating them into a social context may create true progress in psychosocial research.

The number of psychosocial factors is another problem with the current status of psychosocial factors. Measures like depression, hopelessness, optimism, anxiety or a sense of coherence, are both theoretically and empirically related to each other but studies are still looking for "independent" associations for some outcome. As Spicer and Chamberlain (1996) have noted, theoretical progress in flowcharting models may only indicate the addition of new variables or arrows to the models. In the long run it does not increase understanding of human processes unless there is no attempt to incorporate the information from these variables, especially in relation to SES (Elstad, 1998). The hostility concept has the reverse problem as it includes numerous different measures that are not related to each other. For example using Type A behavior measures and cynical hostility measures as an indicator of the same concept (Hemingway & Marmot, 1999) may hide the real association between health and another concept. Furthermore, when the cognitive component of hostility, cynicism, is found to predict some outcome, mood management or anger may be offered as prevention. Despite the fact that cognitive, emotional or biochemical dimensions of the

concepts may occur together, there may be a difference in what is the best way to prevent disease consequences.

The third major problem is related to the association between psychosocial factors and health outcomes. Depression is a heterogeneous collection of several different psychological and physiological symptoms (Clark & Beck, 1999). Current models seem to stress an emotional dimension of psychosocial factors (Gallo & Matthews, 1999; Kubzansky, & Kawachi, 2000). Current studies that report depressive symptoms related to actual diseases usually offer biological explanations (Seligman, 1998). Moderate associations that are found in population based studies with mild depressive symptoms are explained by moderate associations with biochemical factors found among depression patients. When health outcomes are examined it would be important to examine if these outcomes are a consequence of cognitive factors affecting the behavior, affective factors that have endocrinological consequences, or biochemical factors. However, when depressive symptoms are related to nearly all phases of different diseases, it raises the question of whether there is a more general psychological or social explanation for these associations?

6.8. Public health implications

The scientific community is aware that the existence of inequalities has already been shown and that the next step for research is to examine how to diminish these differences (Kangas et al., 2002; Mackenbach & Bakker, 2002). Several authors have proposed enhancing the social and psychological resources of individuals and quality of communal life as targets of intervention (Kawachi, 1999; Marmot, 2001; Wilkinson, 1996). However, Lynch, Davey Smith, Kaplan, and House (2000) argue that these kinds of social cohesion models do not offer any political or social solutions towards diminishing health inequalities or income inequalities (reply Marmot & Wilkinson, 2000). According to Muntaner and Lynch (1999), instead of individuals the model blames adverse social relations in communities as the source of ill health (reply by Wilkinson, 1999 and reply Muntaner, Lynch, & Oates, 1999). Lynch et al. (2000) proposed investment in neo-material conditions via more equitable distribution of public and private resources. However, there have been no apparent examples on how to improve psychological resources.

In relation to the prevention of cardiovascular disease, psychological concepts, such as hostility, are difficult concepts in primary prevention (STM, 1997). The strength of depression among psychosocial factors is that there are widely used screening measurements.

Furthermore, there is treatment to offer for those who become diagnosed as depressed. However, this is not a solution for health inequalities (Marmot & Wilkinson, 2000), although better treatment for depression is an important target for public health. Further, there are more complicated problems related, especially, to hostility. If hostility (or one of its components) is shown as a health damaging factor, what would be the level to start prevention or individual treatment? Cynical hostility, often related to health outcomes, was not related to the anger expression (AX/Out) dimension. There is a large amount of literature about controlling your anger, but is this the correct treatment for cynical hostility? As a provocative example, obese women who have been discriminated against in social relations as well as occupational careers may become cynical in relation to other people. At the individual level, many of the recommendations of anger management literature are excellent for everybody (no rush, be polite) but it is unlikely that they resolve the health inequalities or social inequalities. Despite the fact that hostility or depression are not adequate targets for prevention, these traits can become difficult individual problems and social problems for people in the vicinity of an aggressive person. After decades of work with depression, Aaron Beck, has recently published “Prisoners of hate: the cognitive basis of anger, hostility, and violence” (Beck, 1999). The strengths of this book are cognitive models of hostile behavior that treat hostility as an interpersonal and social problem, not only an emotion regulation problem. Unfortunately, for this study, there is a jump from hostility as a problem of extremist groups to hostility in international politics. This leaves factors relating to social stratification out of Beck’s scope, as with depression.

Compared to its significance in health inequalities (Cavelaars et al., 2000), SES differences in smoking are the less extensively examined areas. Two recent extensive and influential reviews, the Nicotine and Public Health (Ferrence et al., 2000) and, tobacco harm reduction report by the U.S. Institutes of Medicine (Stratton, Shetty, Wallace, & Bondurant, 2001), do not include any discussion on SES differences. Still, SES is the best predictor of who is a smoker in many countries with active tobacco control policy. However, there were no SES differences in cessation motivation that is an important message to public health policy. Smokers in higher SES had better self-efficacy in cessation than lower SES smokers. One explanation for differences in self-efficacy may be differences in addiction. However, there must be explanations as to why smokers in low SES are more addicted to nicotine. Further, recent studies also have found that adolescents, who have more negative emotions like anger, are more likely to smoke (Whalen, Jamner, Henker, & Delfino, 2001; Wills,

Sandy, & Yaeger, 2002). Given that low SES adolescents are especially likely to smoke more, it gives rise to the question, do these adolescents smoke due to social problems that also cause more emotional tension or to regulate their mood independently of SES. Since most of the smokers are in a low SES position, any public health action that works, especially in these groups, will have a great impact on smoking prevalence. Therefore, studies that concentrate on socioeconomic differences in smoking cessation or initiation will have a big impact on health inequalities.

Friedman and Brownell (1995) propose that studies should examine the etiology of obesity and who will suffer and how because of their obesity, instead of a dichotomy comparison between obese vs. non-obese. As there is clear SES difference in obesity this could also be used as an etiological factor. One clear difference between smoking and obesity or weight control is the lack of physiological addiction, despite the fact that there are some reports on carbohydrate craving. Even if there is no physiological addiction, weight control or weight loss is not easier to achieve than smoking cessation. After losing weight many persons have continuous concerns and anxiety about relapsing from weight control (Sarlio-Lähteenkorva, 1999). With current increasing SES differences in obesity this makes obesity another example of interplay between SES, psychosocial factors and health behavior.

7. CONCLUSIONS

Anger expression (AX/Out) had moderate positive correlations with indicators of SES while another hostility indicator, cynical distrust, had a clear negative correlation with SES. This suggests that hostility is currently too broad a concept, especially within socioeconomic health inequality research. There is a need to develop a more accurate definition of how hostility and its different components relate to health, including the social context. Using SES as an etiological factor may lead to the new question of why higher SES groups have an equal amount of depressive symptoms as lower SES groups. Furthermore, mutual associations between psychosocial factors need to be studied instead of only examining the association between one psychosocial factor with health outcomes.

Despite clear SES differences in smoking prevalence there were no SES differences in the motivation to quit smoking, but smokers in higher SES groups had more self-efficacy in smoking cessation. Socioeconomic differences in smoking cessation have not been examined very extensively. Widening SES differences in smoking is a major cause of SES differences in health in most of the northern European countries. Therefore, studies should more closely examine the psychosocial factors that lead to SES differences in smoking. This would also help develop better programs to prevent smoking.

There were more smokers among those who had depressive symptoms, and smokers with elevated depressive symptoms smoked more than other smokers. Female smokers with depressive symptoms were more motivated to quit smoking but both male and female smokers with elevated depressive symptoms had lower self-efficacy in smoking cessation. Cynical distrust was related only to lower self-efficacy. Further studies should not only examine hostility and depressive mood as indicators of negative affects or withdrawal problems but also as cognitive factors that may influence decision-making and smoking related behavior.

Depressive symptoms had moderate correlations with BMI and WHR. Further studies should consider psychosocial factors both as consequences and predictors of obesity, and these effects should be studied using longitudinal designs. In the prevention of obesity, more specific measures of weight related behavior should be included to be better able to find explanations for SES differences in obesity. As depressive symptoms seem to influence both weight gain and weight loss, these symptoms are difficult to use as an obesity predictor in

weight related studies. Therefore, obesity research should more extensively examine whether paying more attention to psychosocial factors, such as depressive symptoms, improve the results of weight control practices. Incorporating social context into the analysis of weight change would improve information relevant to obesity prevention.

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